

# Virginia Local Official's Guide to FLOODPLAIN MANAGEMENT

guidance for those regulating development in the floodplain

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# CHAPTER 1: PURPOSE AND INTENT OF THE LOCAL OFFICIAL'S GUIDE

## 1.1 SUMMARY OF THE GUIDE

Reducing future flood losses depends to a great extent on proper building construction in areas subject to flooding. This handbook is a tool for building inspectors, zoning administrators and other floodplain managers to help guide construction in flood-prone areas and to meet the requirements of the National Flood Insurance Program (NFIP), state statutes and building codes, and local zoning ordinances.

The need to take flood hazards into account when permitting building construction can be demonstrated by the following statistical information:

A residential structure built in a flood-hazard area with its lowest floor (including basement) below the base flood (100-year) flood elevation stands a 26 percent chance of being flooded before the average 30-year mortgage is paid off. That same building stands only a one percent chance of having a fire in 30 years. In other words, the building is 26 times more likely to be damaged by flood than by fire!

Topics covered in this handbook include floodplain construction and building code requirements, the duties and responsibilities of the building inspector under the NFIP and the Virginia Uniform Statewide Building Code and flood-resistant building techniques and materials.

Chapter One contains introductory information explaining how to use the Guide and provides other resources. Chapter Two includes a history of the NFIP and describes the roles of the various levels of government (i.e., federal, state, and local). Chapter Three describes how FEMA prepares flood studies and floodplain maps which are used to guide development in the floodplain. In addition, Chapter Three explains how and why the studies and maps are revised. Chapter Four provides an explanation of the NFIP requirements for development, permitting, inspections, enforcement, compliance, and variances. Chapter Five discusses specific recommendations for communities that wish to provide a greater degree of safety and protection by adopting flood damage reduction standards that exceed the minimum requirements of the NFIP. Look in this chapter for good ideas that will help your community minimize future damage. If you already have older buildings in your floodplains, you can find suggestions for handling redevelopment proposals.

## 1.2 INTRODUCTION AND HOW TO USE THIS GUIDE

The Virginia Local Official's Guide for Floodplain Management is designed as a desk reference for local floodplain management administrators and their permit staff who work with the public. You may find that your job is easier if you can utilize diagrams and photographs to assist property owners, builders, surveyors, homeowners, and others. The Guide has quick answers to questions commonly asked by local floodplain management administrators. Hopefully, this will speed up the permit review and also lead to better compliance during construction.

This Local Official's Guide explains local administration of floodplain management regulations and how local officials can utilize resources from the state and federal government to assist them with administration of an effective program. The Guide should help answer questions that local administrators may have about the NFIP and Floodplain Management in general. The guidance follows the minimum requirements for participation in the National Flood Insurance Program (NFIP). However, in a number of places, recommendations are made to better protect people and property – and to make the local official's job easier.

The *Virginia Citizen's Guide for Floodplain Management* is another helpful tool which is targeted for people that develop or live in the floodplain areas of the Commonwealth. It can be used when they are checking to make sure that floodplain requirements have been satisfied. Copies of both Guides can be downloaded from DCR's webpage ([www.state.va.us/dcr/sw/floodpln.htm](http://www.state.va.us/dcr/sw/floodpln.htm)).

## 1.3 COMMONS ACRONYMS

BFE - Base Flood Elevation  
CLOMA - Conditional Letter of Map Amendment  
CLOMR - Conditional Letter of Map Revision  
CLOMR-F - Conditional Letter of Map Revision based on fill  
CFR - Code of Federal Regulations  
CRS - Community Rating System  
DCR – Virginia's Department of Conservation and Recreation  
FBFM - Flood Boundary Floodway Map  
FEMA - Federal Emergency Management Agency  
FIMA - Federal Insurance and Mitigation Administration  
FIS - Flood Insurance Study  
FIRM - Flood Insurance Rate Map  
FHA - Federal Housing Authority  
FMA - Flood Mitigation Assistance  
HMGP - Hazard Mitigation Grant Program  
HUD - Housing and Urban Development  
HVAC - Heating, Ventilating, and Air Conditioning

ISO ISO (Insurance Services Office) - Commercial Risk Services, Inc.  
LAG - Lowest Adjacent Grade  
LOMA - Letter of Map Amendment  
LOMR - Letter of Map Revision  
LOMR-F - Letter of Map Revision Based on Fill  
NFIP - National Flood Insurance Program  
SBA - Small Business Administration  
SFHA - Special Flood Hazard Area  
USACE - United States Army Corps of Engineers  
USGS - United States Geological Survey  
VA - Veterans Administration  
VDOT - Virginia Department of Transportation  
WYO - Write Your Own Insurance Companies

## 1.4 RESOURCES USED TO DEVELOP THIS MANUAL

- Indiana Department of Natural Resources Division of Water - "Local Floodplain Administrator's Guide" (2002)
- Mississippi "Floodplain Management Handbook for Community Administrators" (2004)
- Michigan Department of Environmental Quality's "Floodplain Management for Local Officials" (2002)
- "Texas Guide to Local Floodplain Management" (2001)
- "Maine Floodplain Management Handbook" (2000)
- North Carolina Division of Emergency Management – "Tools and Techniques for Mitigating the Effects of Natural Hazards"
- Answers to Questions About the NFIP (FEMA F-084)
- Association of State Floodplain Managers "Effective State Floodplain Management Programs" (2004)
- FEMA's "National Flood Insurance Program – Program Description" (2002)

## 1.5 WANT TO LEARN MORE?

Although this manual is intended to be comprehensive, you may come across individual situations that will require additional guidance. You don't need to guess to figure out the best approach. Remember, the NFIP State Coordinator is there to help. When faced with unusual conditions or difficult decisions, the NFIP State Coordinator can give advice or special assistance. When necessary, the State also can seek opinions and interpretations from the Federal Emergency Management Agency.

Contact your local community administrator or the Virginia NFIP Coordinator at the Division of Dam Safety and Floodplain Management at the Virginia Department of Conservation and Recreation 804-786-1716.

Also, valuable information is available on the web. The following web sites may be able to assist you.

([www.vaflood.org](http://www.vaflood.org))

American Society of Civil Engineers

([www.asce.org](http://www.asce.org))

National Flood Determination Association

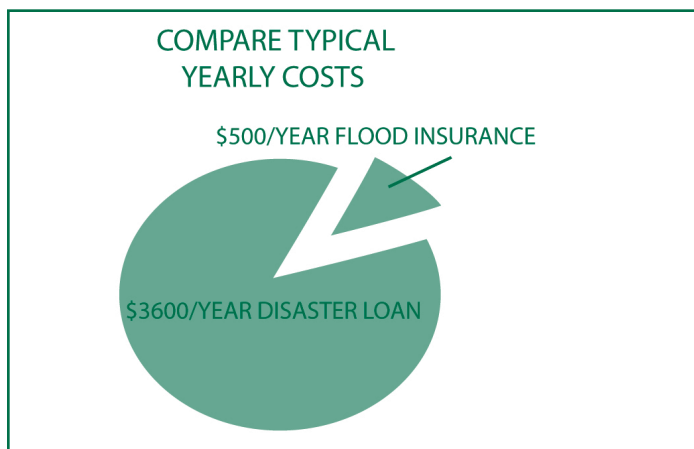
([www.floodassoc.com](http://www.floodassoc.com))

# CHAPTER 2: EXISTING ROLES AND RESPONSIBILITIES FOR FLOODPLAIN MANAGEMENT

## 2.1 THE NATIONAL FLOOD INSURANCE PROGRAM

The NFIP was created in 1968 as a partnership between the Federal and Local government to alleviate some of the problems associated with flooding. The program established national floodplain construction standards to mitigate future damage caused by flooding. Participating is voluntary, but the benefits of joining are considerable. To be eligible for participation in the program, a community must adopt, administer, and enforce an ordinance incorporating all applicable State and Federal floodplain regulations. Participation in the program allows the residents of the community to be eligible for the purchase of flood insurance to help deal with losses from flooding.

Federal flood insurance is designed to provide an alternative to disaster assistance and disaster loans. Disaster assistance is a poor choice – it never comes close to covering all the costs of repairing homes and businesses. It is especially important to remember that disaster assistance is available only after the floods that are declared major disasters by the President of the United States. Federal flood insurance also is a better alternative than disaster loans that are made available only when a disaster declaration is made by the President or by the Small Business Administration. Loans require repayment, typically over a 10-year period. Insurance will pay whenever damage from a qualifying flood event occurs.



### A. THE NEED FOR FLOOD INSURANCE

NFIP coverage is available to all owners of insurable property (a building and/or its contents) in a community participating in the NFIP, regardless of flood zone designation. Almost every type of walled and roofed building that is principally above ground and not entirely over water may be insured if it is in a participating community. In most cases, this includes manufactured (i.e., mobile) homes anchored to permanent foundations, but does not include travel trailers or converted buses or vans. Contents of insurable walled and roofed buildings also may be insured under separate coverage.

After a community joins the NFIP, a policy may be purchased from any licensed property insurance agent or broker who is in good standing in the State in which the agent is licensed. A policy may also be obtained through an agent representing a WYO company or an employee of the company authorized to issue the coverage.

The WYO Program, started in 1983, is a cooperative undertaking of the insurance industry and the FIA. The WYO Program allows participating property and casualty insurance companies to write and service the Standard Flood Insurance Policy in their own names. The companies receive an expense allowance for policies written and claims processed while the Federal government retains responsibility for underwriting losses. The WYO Program operates within the context of the NFIP, and is subject to its rules and regulations.

A number of factors are considered in determining the premium for flood insurance coverage. They include: the amount of coverage purchased; location of building; NFIP entry date; age of building; building occupancy; design of the building; and, for buildings in SFHAs, elevation of the building's lowest floor in relation to the BFE.

## B. THE NFIP IN VIRGINIA

Currently in Virginia, there are 270 communities participating in the NFIP. Local governmental units (counties, cities, towns) participating in the program are given assistance on various levels, depending on local requests for assistance or incidents of non-compliant development identified, within the partnership of the NFIP. The Virginia Department of Conservation and Recreation, Division of Dam Safety and Floodplain Management, functions as the administrator of the NFIP in the Commonwealth. The Division's Floodplain Management Program staff work in conjunction with Local, State, and Federal entities to assist those communities that have recognized the need to enforce floodplain management standards.

## C. BRIEF HISTORY OF THE NFIP AND ITS REGULATIONS

In 1968, Congress passed the National Flood Insurance Act based on findings that: "(1) a program of flood insurance can promote the public interest by providing appropriate protection against the perils of flood losses and encouraging sound land use by minimizing exposure of property to flood losses; and (2) the objectives of a flood insurance program should be integrally related to a unified national program for floodplain management..."

In the late 1960s, Federal officials originally estimated that only 5,000 communities had flood hazards. As they looked more carefully at the problem, they determined that more than 20,000 counties and towns have some degree of risk. Today, flood insurance is available in over 19,000 communities and U.S. territories, including Indian tribes, authorized tribal organizations, and Alaska Native villages, that have voluntarily adopted the NFIP requirements.

Although federal assistance is still a vital part of disaster response and recovery, the NFIP saves the

U.S. taxpayer millions of dollars each year. Major flood disasters have always had an impact on the NFIP. Hurricane Agnes struck the East Coast in 1972. At the time, there were fewer than 1,200 communities in the NFIP, and only 95,000 homeowners had insurance policies. Hurricane Agnes caused a total of \$3–\$4 billion in damage and affected states from the Gulf Coast all the way to Canada. Fewer than 1% of the damaged buildings were insured, and only \$5 million was paid in insurance claims.

After that, it became clear that many flood-prone communities needed more incentive to join the NFIP. Even with the cost of insurance for older buildings subsidized, most people did not purchase policies because they generally didn't think a disaster would hit their towns. The Flood Disaster Protection Act of 1973 was passed, and its most significant impact was the mandatory purchase requirement. Since then, mortgage lenders and banks were supposed to require that borrowers obtain flood insurance on homes located in mapped floodplains.

In 1981, the Reagan Administration set a goal to make the NFIP self-supporting by 1988. That would mean that no taxpayer support is needed to pay claims and operating expenses. One step towards that goal was a decrease in the amount of subsidy for older buildings. In addition, rates were increased and coverage of certain items in basements was sharply limited. These measures, combined with a number of years without major floods, allowed the NFIP to achieve self-supporting status in 1985, three years before the target date.

In 1989, Hurricane Hugo hit South Carolina. Flood insurance payments totaled nearly \$350 million, about 35% of the \$1.1 billion in federal disaster support. Other major floods have prompted significant payments for flood insurance claims, helping thousands of home and business owners recover without burdening the federal government and taxpayers. Some notable events include the Midwest Floods of 1993 with \$271

million in claims, Hurricane Georges (1998, \$149 million), Hurricane Allison (2001, \$1.1 billion), and Hurricane Isabel (2003, \$421 million).

Through those major flood disasters and thousands of small events, the NFIP is certainly doing what Congress anticipated – saving taxpayer dollars. The most important reason the NFIP works is because properly built homes do not get damaged, or at least they are damaged much less than if they had been built flat on the ground. On average, buildings constructed in compliance with NFIP floodplain rules sustain 77% less damage than those that are not built properly.

In 1998, the NFIP celebrated its 30th anniversary. Through successful partnership with the private insurance industry, the NFIP provides efficient service to flood insurance policyholders. Through partnerships with communities, the NFIP supports both damage reduction and preservation of natural and beneficial floodplain functions.

### **National Flood Insurance Act**

The NFIP, enacted in 1968, was designed to alleviate damage to communities and individual hardships caused by flood. Under this program, insurance was made available to homeowners and businesses. New construction in a SFHA was required to be located and built in such a way that the potential for damages and loss of life would be kept at a minimum. The economic justification for the program was the potential to reduce the need for dependence on massive flood disaster relief through safer construction.



**NATIONAL  
FLOOD  
INSURANCE  
PROGRAM**

### **Flood Disaster Protection Act**

The 1968 NFIP Act was expanded in 1973 by the Flood Disaster Protection Act. This act provided for affordable flood insurance through a federal subsidy. In return, communities were required to adopt and administer local measures that protect lives and regulate construction in the floodplain.

#### **The Act provides that:**

- Limits on insurance coverage are increased;
- The emergency program (the initial phase of a community's participation) is continued, assuring that individuals and communities can obtain otherwise unavailable flood insurance;
- Insurance is required on all federal or federally assisted financing of construction in flood-prone areas; and
- Federal flood elevation determinations are accelerated.

Minimum regulation standards for a community enrolling in the NFIP require that permits be issued for all construction and substantial improvements in a flood hazard zone and that all permits must be reviewed to assure that sites are reasonably free from flooding. In addition, communities must require:

- Proper anchoring of structures;
- The use of construction materials and methods that will minimize flood damage; and
- New or replacement utility systems to be located and designed to prevent flood loss.

## **Unified National Program for Floodplain Management (1976)**

This program accomplishes the following:

- Sets forth a conceptual framework for floodplain management;
- Identifies available tools and strategies;
- Assesses the implementation capability of existing Federal and State agencies and programs; and,
- Makes recommendations for achieving a unified national floodplain management program.

The program offers guidance applicable to both government and private interests.

### **Executive Order 11988**

This floodplain management executive order signed by the President on May 24, 1977, requires federal agencies to avoid, to the extent possible, the long-term and short-term adverse impacts associated with the occupancy and modifications of floodplains and to avoid the direct or indirect support of floodplain development whenever there is a practicable alternative. The preferred method for satisfying this requirement is to avoid sites within the floodplain. If an action must be located within the floodplain, the executive order requires that agencies minimize potential harm to people and property and to natural and beneficial floodplain values by incorporating current floodplain management standards into the project.

### **National Flood Insurance Reform Act of 1994**

The reforms made to the National Flood Insurance Act in 1994:

- Created a new Mitigation Insurance Benefit;
- Improved compliance with mandatory flood insurance purchase requirement;
- Created a new Mitigation Assistance Program;
- Increased flood insurance coverage limits;
- Codified the Community Rating System; and
- Increased the flood insurance policy waiting period to 30 days.

## **D. THE MANDATORY PURCHASE REQUIREMENT**

From 1968 until the adoption of the Flood Disaster Protection Act of 1973, the purchase of flood insurance was voluntary. However, in 1973 Congress decided to make flood insurance a requirement for many properties. For the first time, regulated lending institutions were not supposed to make, increase, extend, or renew any loan secured by improved real estate or located in a special flood hazard area unless the secured property and any personal property securing the loan was covered for the life of the loan by flood insurance. Congress decided to make the purchase of flood insurance a requirement because so few flood-prone structures were covered by flood insurance and too many people continued to need federal disaster relief.

In 1988, Congress began to consider more changes to the NFIP. Flooding along the Mississippi in 1993 prompted further evaluation, and the National Flood Insurance Reform Act was passed in September, 1994. It included a significant boost to improve compliance with the mandatory purchase requirements of the NFIP by lenders, service-providers, and secondary market purchasers. Increasing compliance and participation in the NFIP is designed to decrease the financial impact of flooding to the federal government, taxpayers, and citizens in areas prone to flooding.

Additional information about the mandatory purchase requirements is in the FEMA booklet entitled Mandatory Purchase of Flood Insurance Guidelines. These materials should be accessible on FEMA's website at [www.fema.gov/fima](http://www.fema.gov/fima), just click on "Library" in the index, go to the "Lender Publications" category, and select "Mandatory Purchase of Flood Insurance Guidelines"

## **E. OBJECTIVES OF THE NFIP**

Nearly every county in the U.S. has experienced at least one major disaster declaration. In the face of mounting flood losses and rising disaster relief costs related to flooding, the U.S. Congress created the National Flood Insurance Program in 1968. The intent was to reduce future flood damage through local floodplain management ordinances, and to have people who live at risk help pay for their recovery through an insurance mechanism.

Another important objective of the NFIP was to break the cycle of flood damage. Many buildings have been flooded, rebuilt, and flooded again. Sometimes this cycle occurred every couple of years, with people rebuilding in the same flood-prone areas, with the same flood-prone construction techniques.

By encouraging communities to guide development to lower risk areas, and by requiring elevation of new buildings and those that sustain major damage, one of the long-term goals of the NFIP can be achieved: create disaster resistant communities. Older buildings may be removed, replaced, upgraded or modified with techniques that lead to little or no flood damage. Through the land development process, developers can often be encouraged to stay out of high-risk areas.

## **F. HOW THE NFIP WORKS**

The Community Status List for Virginia is updated regularly on FEMA's website. In addition to listing each participating community in the NFIP, it lists the communities that have identified Special Flood Hazard Areas (SFHAs), but which do not participate. Also listed is the date of entry for each community, as well as the date of the current effective maps.

### **Emergency Phase**

Until recently, the Emergency Phase of the NFIP was the initial phase of participation. It was designed to provide a limited amount of insurance at less than actuarial rates. A community in the Emergency Phase either does not have an identified and mapped flood hazard or has been provided with a Flood Hazard Boundary Map. Adoption of a limited floodplain management ordinance is required. About one percent of the nearly 20,000 communities participating in the NFIP nationwide remain in the Emergency Phase, including four of Virginia's 270 participating communities.

In the Emergency Phase, only limited flood insurance coverage is available. Single-family dwellings are eligible for \$35,000 building coverage and \$10,000 contents coverage. Other residential, non-residential, or small business structures are eligible for \$100,000 building coverage and \$100,000 contents coverage.

### **Regular Phase**

Usually a community participating in the Regular Phase of the NFIP is provided with a Flood Insurance Rate Map (FIRM) and a detailed engineering study, termed a Flood Insurance Study. Under the Regular Phase, more comprehensive floodplain management requirements are required in exchange for higher amounts of flood insurance coverage. Maximum amounts of coverage are established by law.

As of 2004, residential structures are eligible for \$250,000 building coverage and \$100,000 contents coverage. Non-residential structures are eligible for \$500,000 building coverage and \$500,000 contents coverage. To find out more about flood insurance, download the booklet "Answers to Questions About The National Flood Insurance Program" from FEMA's web page. To order the booklet, call the FEMA Distribution Center (1-800-480-2520).

	Emergency Program	Regular Program
<b>Building Coverage</b>		
Single-family dwelling	\$35,000	\$250,000
Other residential	\$100,000	\$250,000
Non-residential/Small Business	\$100,000	\$500,000
<b>Contents Coverage</b>		
Residential	\$10,000	\$100,000
Non-residential/Small Business	\$100,000	\$500,000

Some general information is available on the Internet at [www.floodsmart.gov](http://www.floodsmart.gov). Use this site, or call the NFIP toll-free hotline (1-888-379-9531), especially when people have questions about where and how to buy flood insurance.

## H. IMPACT OF NON-PARTICIPATION IN THE NFIP

Communities with SFHAs that choose not to participate – or that withdraw or have been suspended – probably do not regulate flood hazards to the NFIP minimum requirement. They may cause undue difficulties for their citizens, especially in the aftermath of a damaging flood event. The following apply to non-participating communities:

- Federal flood insurance is not available.
- Federal agencies shall not make grants or loans for buildings in identified flood hazard areas, including such agencies such as Farmer's Home Administration (FHA), Housing and Urban Development (HUD), Environmental Protection Agency (EPA), Small Business Administration (SBA), and Health and Human Services. This rule applies to federal grants and loans for any reconstruction, repair, construction, rehabilitation, or additions to structures in SFHAs.
- Federal disaster assistance will not be provided in identified flood hazard areas for permanent restorative construction and grants. This means that public buildings damaged by flood are not eligible for federal disaster assistance.
- Federal mortgages shall not be available for structures in identified flood hazard areas, including loans or grants guaranteed by FHA, Veterans' Administration, SBA, and federal instrumentalities such as the Federal Deposit Insurance Corporation and the National Credit Union Administration.
- The National Flood Insurance Reform Act of 1994 places restrictions on conventional loans, and lenders must notify the buyer or lessee if a property is in a flood hazard area.

- The Flood Insurance Rate Map and appropriate actuarial rates go into effect regardless of whether the community participates. Structures in SFHAs will be actuarially rated if the community later decides to join the NFIP. This could lead to extremely expensive insurance.
- The local governing body may be held liable for not participating in the NFIP because the action denies citizens the opportunity to purchase flood insurance, and does not take positive steps to reduce the exposure of life and property in the face of authoritative scientific and technical data.

## G. IMPACT OF NON-COMPLIANT DEVELOPMENT OR FLOODPLAIN ORDINANCE

When your community agreed to participate in the NFIP, it adopted an ordinance with minimum criteria and agreed to enforce it to reduce future flood damage. In return, flood insurance and other forms of federal assistance are made available. If a community fails to uphold and enforce its ordinance then FEMA can impose sanctions.

Examples of deficiencies and violations that FEMA considers serious enough to place a community on probation include:

- Failure to require permits for all construction, subdivisions, and other development in flood hazard areas,
- Failure to obtain and reasonably utilize flood hazard data,
- Adoption of ordinance provisions that are inconsistent with the minimum requirements of the NFIP or that do not contain adequate enforcement provisions,
- Application of procedures that do not reasonably ensure compliance,
- Poor permit reviews that allow non-compliant activities,
- Failure to correct violations to the extent practicable,
- A pattern and practice of issuing variances that are inconsistent with the NFIP variance criteria, and
- Allowing enclosures below elevated buildings to be converted in ways that are not in compliance with the ordinance.

### 1) Probation

FEMA looks for “substantive and multiple” deficiencies and/or violations before undertaking probationary action. Probation puts a \$50 surcharge on all new and renewed flood insurance policies. Importantly, FEMA is required to notify all policyholders that poor compliance is the reason for the extra charge. FEMA and the State will closely monitor progress toward correcting the problems that led to probation, which lasts for a minimum of one full year. It may be continued beyond that, if necessary. Probation is the precursor to suspension.

### 2) Suspension

Communities may be suspended from the NFIP for failure to correct any of the problems which lead to probation. In order to be reinstated, a community must correct or mitigate identified violations to the fullest extent possible and institute acceptable administrative and enforcement procedures.

A community may be suspended without probation if its ordinance is not updated when required. FEMA and the State work with communities to revise ordinances. Ordinance revisions may be prompted by a map revision that requires a more stringent ordinance. If FEMA revises the standards in the NFIP regulations (Section 60.3), all communities must update their ordinances.

New flood insurance policies may not be written and existing policies may not be renewed in suspended communities. This will severely restrict the availability of mortgages and other loans, federal grants, and disaster assistance. If an insurance agent mistakenly writes a policy in a suspended community, FEMA is not required to pay a subsequent claim, and will reimburse premiums paid after suspension took effect. This has caused a great deal of distress after floods, when homeowners find out that the insurance they thought they had, is not valid. Insurance agents who continue

to write policies in suspended communities may be held liable for uninsured losses.

### 3) Corrective Measures

If FEMA or the State discover deficiencies or violations, community officials will need to take appropriate action to correct them. Corrective actions include:

- Demonstrating that a structure is not in violation by providing missing permit information;
- Rescinding permits for structures not yet built or in early stages of construction;
- Demolishing or modifying noncompliant structures or removing fills in the floodway;
- Seeking civil/criminal penalties; or
- Submitting information to FEMA to deny flood insurance to specific buildings under Section 1316 of the NFIP.

## 2.2 FEMA'S ROLES AND RESPONSIBILITIES

The Federal Emergency Management Agency (FEMA) is an independent Federal agency reporting to the President. Founded in 1979, FEMA's mission is to: Lead America to prepare for, prevent, respond to, and recover from disaster.

FEMA is responsible for coordinating the Federal response to floods, earthquakes, hurricanes, and other natural or man-made disasters and providing disaster assistance to States, communities and individuals. Disasters are declared by the President at the request of the Governor of the impacted State if the impacts of the disaster exceed the ability of the State and the affected communities to respond. For declared disasters, FEMA activates the Federal Response Plan with 27 signatory agencies. The Federal Response Plan provides a framework for the coordination of assistance to States, communities, and individuals by Federal agencies.

The Federal Insurance and Mitigation Administration (FIMA) within FEMA is responsible for administering the National Flood Insurance Program (NFIP) and administering programs that provide assistance for mitigating future damages from natural hazards. FEMA also provides training and technical assistance to governmental and non-governmental entities in preparing for and responding to disasters and for protecting against future disasters through mitigation. In addition to a headquarters office in Washington, D.C., FEMA has 10 regional offices.

FEMA's NFIP activities can be summarized by four overall categories with various programs associated with each activity. Through these activities, FEMA administers a comprehensive strategy to reduce the losses associated with flooding. Those categories are listed as followed.

### A. PROVIDING AFFORDABLE FLOOD INSURANCE COVERAGE

Section 1304 of the 1968 Act authorizes the Director of FEMA to establish and carry out "a national flood insurance program which will enable interested persons to purchase insurance against loss resulting from physical damage to or loss of real property or personal property" resulting from flood. Flood insurance provides the mechanism by which floodplain occupants are compensated for flood damages. Flood insurance also provides a way for some of the financial burden of flood losses to be removed from taxpayers, such as for Federal disaster assistance and casualty loss deductions under Federal income taxes.

The number of policies in force in the United States has increased from about 95,000 before the Flood Disaster Protection Act of 1973, to 2.2 million in 1989, to over 4.3 million currently. Any property owner of insurable property may purchase flood insurance coverage, provided that the community in which the property is located is participating in the NFIP. The amount of flood insurance coverage in force as of March 31, 2002 is over \$606 billion.

The National Flood Insurance Fund (NFIF) is the instrument through which the Federal Government fulfills its financial responsibilities for the NFIP. In fiscal year 2001, FIMA took in about \$1.5 billion in revenue, mostly from insurance premiums and a \$30 Federal Policy fee on each policy sold or renewed. Revenues from insurance premiums are used to pay losses, pay interest to the Treasury, service the policies, and pay Increased Cost of Compliance claims that provide financial resources for protecting buildings from future flood damages. Revenue from the Federal Policy Fee supports almost all the flood mapping and floodplain management activities of the Program including the Flood Mitigation Assistance program.

While flood insurance was discussed previously in this chapter in Section 2.1, here are some additional facts about flood insurance related to damages incurred from flooding that will be helpful for local floodplain management administrators to be able to share with their citizens:

- Policy-holders are in control; flood insurance claims are paid even if a disaster is not declared by the President.
- Between 20 and 25 percent of all claims paid by the NFIP are outside of Special Flood Hazard Areas.
- The average premium is approximately \$400 per year depending on where you live and the coverage you choose. In low-to-moderate risk areas, coverage can be purchased for just over \$100 a year.
- Buy as much flood coverage as you can. Primary residences insured for 80% of their value, or the maximum amounts available, get replacement cost coverage. It pays the amount needed to repair or replace most of the building elements up to the policy limits, without deduction for depreciation, once repairs are made.
- There is a 30-day waiting period from the time a policy is purchased until you are covered, with the following exceptions:
  - There is no waiting period if you have an existing flood insurance policy and an additional amount of flood insurance is required with the making, increasing, extending or renewing of a loan, such as a second mortgage, home equity loan, or refinancing. Coverage is effective immediately, as long as the premium is presented at or prior to loan closing.
  - There is no waiting period when flood insurance is required as a result of a lender determining that a loan which does not have flood insurance should be protected by flood insurance. Coverage is effective immediately, as long as the premium is presented at the completion of a loan application.
  - There is no payback requirement.
  - Flood insurance policies are continuous, and are not non-renewed or cancelled for repeat losses.
  - The annual premium for an NFIP policy is less expensive than interest on Federal disaster loans.

## B. ENSURING NFIP ENFORCEMENT AND COMPLIANCE

### 1) *Community Assistance Program – State Support System Element (CAP-SSSE)*

FEMA monitors communities through the Community Assistance Program to ensure that they have adopted an ordinance that meets or exceeds the minimum NFIP floodplain management criteria and to ensure that they are effectively enforcing their ordinance. While the NFIP floodplain management criteria are administered by States and communities through their floodplain management regulations, FEMA's role is to provide technical assistance and to monitor communities for compliance with the minimum NFIP criteria. If communities do not adequately enforce their floodplain management regulations, they can be placed on probation and potentially suspended from the Program following probation.

FEMA or States on behalf of FEMA conduct Community Assistance Visits (CAVs) and Community Assistance Contacts (CACs) to monitor community floodplain management programs. A CAV is a scheduled visit to an NFIP community for the purpose of conducting a comprehensive assessment of the community's floodplain management program. The CAV is also used as an opportunity to provide technical assistance to the community. A CAV typically involves a tour of the floodplain, a meeting with local floodplain management officials, and an examination of the community's floodplain development permit and variance files. The visit is documented in a follow-up letter to the community. If any issues are identified during the CAV, such as a possible floodplain violation or program deficiency, these issues are also addressed in the follow-up letter. The community is responsible for resolving any program deficiencies or remedying any violations identified.

A CAC is used to establish a contact with a community for the purpose of determining if any problems or issues

exist and to offer the community assistance if necessary. CACs can be conducted by means of a telephone call or brief visit. While CACs are a less comprehensive assessment of a community's floodplain management program, sufficient information about the community's floodplain management program can be obtained in order to determine whether there are more serious floodplain management problems in the community.

Several thousand local officials are contacted annually through CAVs, CACs, and other activities such as workshops and formal floodplain management courses. Also, a number of local officials directly contact State or FEMA regional staff for technical assistance. Because of resource limitations in conducting CAVs and CACs in any given year, FEMA has established criteria in prioritizing which communities will be visited or contacted. Basically, a CAV should be conducted in communities with known or suspected program deficiencies or potential violations or communities experiencing development in the floodplain. CACs are not conducted in communities where more serious floodplain problems or issues are known or suspected. CACs are generally used as a screening tool for determining whether a community should receive the level of attention of a CAV. Together, they provide FEMA with an effective means of monitoring participating communities and providing technical assistance.

## 2) *Community Rating System (CRS)*

The NFIP has been successful in requiring new buildings to be protected from damage by a 100-year flood. However, flood damage still results from floods greater than the 100-year flood and from flooding in unmapped areas. Under the Community Rating System (CRS), there is an incentive for communities to do more than just regulate construction of new buildings to minimum national standards. Under the CRS, flood insurance premiums are adjusted to reflect community activities that reduce flood damage to existing buildings, manage development in areas not

mapped by the NFIP, protect new buildings beyond the minimum NFIP protection level, help insurance agents obtain flood data, and help people obtain flood insurance. The discounts may range from 5 to 45 percent.

Participation in the CRS is voluntary. A community in compliance with the rules and regulations of the NFIP may apply. The community's Chief Executive Officer must appoint a CRS coordinator to handle the application work and serve as the liaison between the community and FEMA. The first step in the application process is for the community to obtain a copy of the CRS Coordinator's Manual, which describes the program and gives details on the eligible activities. The CRS coordinator should fill out and submit an application for participation in the CRS. FEMA's CRS contractor will verify the information and arrange for flood insurance premium discounts.

The objective of the CRS is to reward communities that are doing more than meeting the minimum NFIP requirements to help their citizens prevent or reduce flood losses. The CRS also provides an incentive for communities to initiate new flood protection activities. The goal of the CRS is to encourage, by the use of flood insurance premium adjustments, community and state activities beyond those required by the National Flood Insurance Program to:

- Reduce flood losses through:
  - protecting public health and safety,
  - reducing damage to buildings and contents,
  - preventing increases in flood damage from new construction
  - reducing the risk of erosion damage, and
  - protecting natural and beneficial floodplain functions
- Facilitate accurate insurance rating
- Promote the awareness of flood insurance

There are now over 900 communities receiving flood insurance premium discounts based on their implementation of local mitigation, outreach, and educational activities that go well beyond minimum NFIP requirements. Although premium discounts are one of the benefits of participation in the CRS, these communities are carrying out important activities that save lives, reduce property damage, and protect the natural and beneficial functions of floodplains. These 900-plus communities represent a significant portion of the nation's flood risk as evidenced by the fact that they account for over 66% of the NFIP's policy base. Communities receiving premium discounts through the CRS cover a full range of sizes from small to large, and a broad mixture of flood risks, including coastal and riverine.

The CRS – its development and implementation – has benefited from the advice and effort of Federal, State, and local officials, professionals with expertise in floodplain management and insurance, and academics. A multidisciplinary approach led to successful implementation of the program and this same approach has been employed in reviewing and refining the CRS over the last 10 years.

### 3) *Community Information System*

The National Flood Insurance Program (NFIP) - Community Information System (CIS) provides accurate, readily accessible, and pertinent data and information regarding activities and operations related to floodplain management, mapping, and insurance for NFIP Communities. The NFIP-CIS includes demographic, engineering, insurance, and community specific information for those jurisdictions in the United States that have been identified as flood prone.

The objectives of the NFIP-CIS are as follows:

- Be the authoritative information source and official record of NFIP data.
- Provide the means of managing the NFIP by providing capability to address day-to-day issues, problems, program activities, conduct evaluations, track community status, and conduct overall statistical analysis.
- Improve the decision making process.
- Offer an effective means to exchange information between the Federal Insurance Administration (FIA) headquarters and FEMA Regional Offices.

The objective of the Internet-based CIS is to allow state users access to CIS over the Internet.

The NFIP-CIS is capable of performing the following functions:

- Allows the user immediate access to key information about individual flood prone communities for use in responding to telephone inquiries, personal visits, and requests for information and in preparing correspondence and reports.
- Provides the official record of NFIP community status that allows users to maintain data for all flood prone identified communities.
- Allows users to generate reports on NFIP community status such as the Community Status Book Reports.
- Allows users to develop statistics on flood prone communities for the General Accounting Office, Congress, and others on an ad hoc basis.
- Allows users to track key information about a flood prone community such as flood study status, ordinance adoption, and enforcement actions.
- Allows users to analyze data for program priority setting and planning.

#### *4) Biennial Reports*

Communities participating in the NFIP are requested to return a Biennial Report on floodplain activities to FEMA. Every two years, FEMA sends a copy of the required form to the community floodplain administrator. It must be completed and returned within 30 days. The Biennial Report indicates to FEMA the degree of development pressure in the special flood hazard areas. FEMA is especially interested in the number of variances that have been issued in the floodplain. There are also questions about the number of residents and structures in both the community and the floodplain, changes to the floodplain ordinance, adjustments to the community's corporate boundary, changes to streets/roads, observed needs for flood map revisions, and the need for assistance with enforcement/compliance regarding the floodplain management ordinance.

#### *5) Increased Cost of Compliance*

Increased Cost of Compliance (ICC) coverage under the Standard Flood Insurance Policy (SFIP) provides for the payment of a claim to help pay for the cost to comply with State or community floodplain management laws or ordinances from a flood event in which a building has been declared substantially damaged or repetitively damaged. When an insured building is damaged by a flood and the State or community declares the building to be substantially damaged or repetitively damaged, ICC coverage will help pay for the cost to elevate, flood-proof, demolish, or relocate the building.

The maximum amount a policyholder may collect under ICC is \$30,000. This amount is in addition to the building coverage for the repair of actual physical damages from flood under the SFIP. The total amount the policyholder receives for combined physical structural damage from flood and ICC is always capped by the maximum limit of coverage established by Congress. The maximum amount collectible for both ICC and physical damage from flood for a single-family dwelling is \$250,000.

#### *6) Minimum Development and Building Standards*

The National Flood Insurance Act of 1968, as amended, prohibits the Director from selling flood insurance in communities that have not adopted compliant floodplain management regulations. In addition, without the compliant regulations, communities cannot be expected to properly regulate future floodplain development. In Virginia, the Uniform Statewide Building Code covers the structural aspects of the NFIP regulations which is a majority of the requirements. Each community is responsible for building code enforcement or in the case of towns, can utilize a cooperative agreement with counties to conduct building code enforcement.

These regulations must be legally-enforceable, applied uniformly throughout the community to all privately- and publicly-owned land within the floodplain, and the community must provide that the regulations take precedence over any less restrictive conflicting local laws, ordinances, or codes [Title 44 of the Code of Federal Regulations (CFR) 60.1(b)]. Furthermore, any community can exceed the minimum criteria by adopting more comprehensive floodplain management regulations, which are encouraged and take precedence over the minimum NFIP floodplain management requirements. FEMA can suspend communities from the Program for failure to adopt compliant regulations or for failure to maintain their floodplain management regulations in compliance with the NFIP criteria.

#### *7) NFIP Training*

When disasters and emergencies strike, many different organizations must work together to protect property and save lives. Ensuring and enhancing this interoperability is the goal for FEMA's Emergency Management Institute (EMI). A component of the United States Fire Administration, EMI is located on the National Emergency Training Center (NETC) campus in Emmitsburg, Maryland, 75 miles north of Washington, D.C.

EMI is the national focal point for the development and delivery of emergency management training to enhance the capabilities of Federal, State, local, and tribal government personnel as well as volunteers and members of the private sector. EMI courses are structured to meet the needs of these diverse audiences with an emphasis on how the various elements work together.

EMI staff provide training to enhance U.S. emergency management performance through a nationwide program of resident, field, and distance learning activities. 8,000 students attend resident courses at EMI each year while thousands of others participate in field training sponsored by EMI and conducted by State emergency management agencies. Hundreds of thousands more use EMI web-satellite television-, and text-based distance learning programs.

EMI instruction focuses on the four phases of emergency management: mitigation, preparedness, response, and recovery, and covers areas such as natural hazards (earthquakes, hurricanes, floods), man-made hazards (terrorism, hazardous materials, radiological emergency preparedness), and also includes professional development, leadership, instructional methodology, exercise design, and public information. All EMI training is developed in partnership with State and local emergency management agencies.

#### *8) Building Performance Assessment Team Reports*

The Building Performance Assessment Team (BPAT) Program is an award-winning program that uses the combined resources from a Federal, State, Local, and Private-Sector Partnership to study building performance as part of FEMA's national mitigation effort. These teams of experts study building performance in response to major natural disasters. The first widely publicized BPAT Report was for Hurricane Andrew and was completed by Mitigation Division. Mitigation Division members remain a critical element to post-Hurricane BPATs and have supported recent

BPATs for Hurricane Georges. BPAT reports on natural disasters include: Hurricane Andrew, Hurricane Iniki, Hurricane Opal, Hurricane Fran, Hurricane Georges in Puerto Rico, Hurricane Georges in the Gulf Coast, Midwest Tornadoes of May 3, 1999.

#### *9) Educational and Guidance Publications*

FEMA produces an extensive list of educational and guidance materials that deal with all aspects of the NFIP's programs and requirements including technical bulletins that provide specific guidance in meeting the minimum NFIP requirements. A list of those documents is provided in Appendix G.

### **C. PROVIDING FLOOD HAZARD IDENTIFICATION AND MAPPING**

#### *1) Map Modernization*

Floods are the nation's most common and costly natural disaster. To reduce the ever-growing expense to the federal government related to flooding, Congress established the National Flood Insurance Program (NFIP) in 1968. The NFIP guarantees that flood insurance will be available in communities that agree to adopt land-use regulations so that new development is reasonably protected from flood damages.

Maps depicting flood-hazard areas are not only the foundation of the National Flood Insurance Program, but also the basis of sound floodplain management at the local and state levels. Adequate, accurate, and current maps are essential for the program to function. Without quality mapping, neither land-use regulations nor the insurance elements of the program can be effective.

By 2002 these flood hazard maps were averaging over 13 years old nationwide, making them nearly obsolete in some communities, and still many areas of the country were unmapped. In recognition of these needs, Congress directed FEMA in 1994 to establish

the Technical Mapping Advisory Council who in turn made recommendations to FEMA through a series of annual reports and then in a final report in November 2000. FEMA then prepared a plan to implement those recommendations along with the resources necessary to fund its Map Modernization Plan.

FEMA has established a broad goal of modernizing these flood hazard maps nationwide. Initially, in FY2002, FEMA requested that the State NFIP Coordinators prepare a Map Modernization Implementation Plan for their states. This included prioritizing mapping projects for communities in their states based on mapping needs assessments that were performed and input into a national database named Mapping Needs Update Support System (MNUSS).

In order to achieve their goal, in FY2003, FEMA was allocated funding by Congress to implement the Flood Map Modernization Plan that it had been developing since 1995. Each state with an interest and the capability to assist with implementing FEMA's Map Modernization Plan was offered funds to upgrade the plans that were developed in FY2002 and develop Flood Map Modernization State Business Plans.

The program is designed to speed flood map updates by working with local communities and other agencies as much as possible and to tap into the resources that they may be able to apply to the mapping update process. The goal of the Map Modernization Program is to upgrade the flood map inventory by:

- developing up-to-date flood hazard data for all flood-prone areas nationwide to support sound floodplain management and prudent flood insurance decisions;
- providing the maps and data in digital format to improve the efficiency and precision with which mapping program customers can use this information;
- fully integrating FEMA's community and state partners into the mapping process to build on local knowledge and efforts;
- improving processes to make it faster to create and update the maps;
- improving customer services to speed processing of flood map orders and raise public awareness of flood hazards.

FEMA's Multi-Hazard Flood Map Modernization effort includes an integrated partnership composed of multiple State, local, and/or tribal agencies/organizations that contribute to or guide the development of projects. The ultimate goal is devolving floodplain mapping to State/local entities with interest and capability. All endeavors connected with FEMA's Multi-Hazard Flood Map Modernization, including the efforts of states and localities, must contribute to achieving the following objectives:

- Establish and maintain a premier data collection and delivery system.
- Achieve effective program management.
- Build and maintain mutually beneficial partnerships.
- Expand and better inform the user community.

## 2) *Updating Flood Hazard Maps*

FEMA prepares the flood hazard map information used by communities to manage special flood hazard areas (SFHA). The SFHA is the area that is expected to be inundated by the base flood. The base flood has a 1% chance of being equaled or exceeded in any given year. The common name for a flood of this frequency and magnitude is the "100-year flood." Over the course of a typical 30-year mortgage, structures in the SFHA have a 26% chance of being flooded – five times more likely to flood than to experience a major fire.

FEMA uses hydrologic and hydraulic modeling to determine the base flood elevations (BFEs). Topographic maps are used to delineate floodplain boundaries. Where ground elevations are lower than the BFE, the area is designated SFHA. Flood insurance rates are based on the flood zone designation and the associated actuarial risk. FEMA maintains the maps, with the overall goal of reflecting the most current flood hazard information available. Chapter 3 has additional information on using flood hazard maps.

### 3) Mapping Needs Update Support System

In 1994, the Mapping Needs Assessment Process was established to identify and prioritize community map update needs in accordance with Section 575 of the National Flood Insurance Reform Act of 1994. Since May of 1997, more than 18,000 communities have been contacted for map update needs. Information regarding mapping needs are collected by FEMA in the Mapping Needs Update Support System (MNUSS) database. FEMA utilizes resources from State Coordinators, Cooperating Technical Partners (CTPs) and community officials in the assessment of mapping needs and data entry into MNUSS.

MNUSS is a Web-based database that is used to collect and compile mapping needs on a community basis. Information is entered into the database detailing map maintenance and flood data update needs for each community. FEMA Headquarters, Regional Engineers, and State NFIP Coordinators use the information in MNUSS to help prioritize study/restudy projects for funding allocation. The data comprising MNUSS represent a great deal of coordination with communities, States, and Regional Offices to gather mapping needs information. This process is dynamic, and mapping needs can be identified and entered at any time.

## D. PROVIDING RESOURCES FOR HAZARD MITIGATION PLANNING AND REDUCTION PROJECTS

### 1) Flood Mitigation Assistance (FMA)

The Flood Mitigation Assistance (FMA) program provides funding to assist States and communities to accomplish flood mitigation planning and implement measures to reduce future flood damages to structures. This program is authorized under the 1994 Act. These funds can be used before disaster strikes.

The FMA program provides funding up to \$20 million a year with a 75/25 cost share. Examples of eligible activities for planning grants include conducting local planning meetings to obtain citizen input; contracting for engineering or planning technical assistance; surveying structures at risk of flooding; and assessing repetitive losses. Only projects for mitigation activities specified in an approved Flood Mitigation Plan are eligible for project grants. For example, a community may determine in its plan that acquisition of structures would be the preferred alternative for floodway areas, while elevation may be more appropriate solution in other areas of the floodplain.

The purpose of FMA project grants is to assist States and communities in implementing flood mitigation projects to reduce the risk of flood damage to NFIP-insurable structures. Examples of eligible types of projects include:

- Elevation of NFIP-insured residential structures and elevation or dry-floodproofing of non-residential structures in accordance with 44 CFR §60.3.
- Acquisition of NFIP-insured structures and underlying real property.
- Relocation of NFIP-insured structures from acquired or restricted real property to sites not prone to flood hazards.
- Demolition of NFIP-insured structures on acquired or restricted real property.
- Beach nourishment activities that focus on facilitating natural dune replenishment through the planting of native dune vegetation and/or the installation of sand fencing. Placement of sand on beach is not eligible.
- Minor physical flood control projects that do not duplicate the flood-prevention activities of other Federal agencies that address localized flood problem areas such as stabilization of stream banks, modification of existing culverts, creation of small stormwater retention basins. Major structural flood control structures, such as levees, dams, and seawalls are not eligible.

To be eligible for funding, a project must be:

- Cost-effective;
- Conform with applicable Federal and State regulations and executive orders;
- Be technically feasible;
- Conform with the Flood Mitigation Plan; and
- Be located physically in a participating NFIP community that is not on probation.

The 1994 Act directs FEMA to “make every effort to provide mitigation assistance for mitigation plans proposing activities for repetitive loss structures and structures that have incurred substantial damage.” FEMA is focusing the FMA program on repetitive loss properties. The NFIP’s Repetitive Loss Strategy is to identify properties throughout the country that are most at risk for repeat flooding, and to reduce their exposure through targeted buyouts, relocation, and elevation. Approximately 46,000 repetitive loss properties are currently insured. These buildings are projected to cost the program \$200 million per year in claims. New repetitive loss properties continue to emerge each year. FEMA has identified target buildings that are currently insured and have the greatest risk. Most of these target buildings are single-family residences. The limited FMA program funds (\$20 million) are a key resource toward achieving this goal.

For projects that directly affect individual structures, such as elevation, acquisition, or relocation, each structure must have a flood insurance policy in force. FMA will be available to States and communities for mitigation activities that may benefit insurable properties not insured under the NFIP. For minor structural flood control projects, the effectiveness of the project can be based on benefits provided to insurable structures not insured under the NFIP.

## 2) Hazard Mitigation Grant Program (HMGP)

The Hazard Mitigation Grant Program (HMGP) was created in 1988 by Section 404 of the Robert T. Stafford Disaster Relief and Emergency Assistance Act, as amended (amendments include the Hazard Mitigation and Relocation Assistance Act of 1993 and the Disaster Mitigation Act of 2000). The HMGP assists States and communities in implementing long-term hazard mitigation measures for all hazard types following a major disaster declaration. A key purpose of the HMGP is to ensure that the opportunity to take critical mitigation measures to protect life and property from future disasters is not lost during recovery and reconstruction process following a disaster.

HMGP funds are made available based on 15% of the estimated Federal funds to be spent on the Public and Individual Assistance programs (minus administrative expenses) for each disaster. States whose mitigation planning process meets enhanced criteria will be able to receive 20% funding under the regulations implementing the Disaster Mitigation Act of 2000. As of September 2001, 5,560 projects have been approved at a total Federal expenditure of approximately \$2.6 billion.

Eligible mitigation measures under the HMGP include acquisition or relocation of flood-prone structures, elevation of flood-prone structures, seismic rehabilitation of existing structures, and strengthening of existing structures against wildfire. Additionally, up to seven percent of the HMGP funds may be used to develop State and/or local mitigation plans.

The State, as grantee, is responsible for administering the HMGP. Communities develop HMGP project applications and apply for funds through the State. The State notifies potential applicants of the availability of funding, defines a project selection process, ranks and prioritizes projects for funding, and forwards projects to FEMA for approval. The applicant, or subgrantee, carries out approved projects. The State

or local government must provide a 25 percent match, which can be from a combination of cash and in-kind sources.

In response to flood hazards, FEMA's primary emphasis is on nonstructural hazard mitigation measures. Nonstructural measures include the acquisition and demolition, relocation, elevation, or floodproofing of flood-damaged or flood-prone properties.

### *3) Pre-Disaster Mitigation Grant Program*

The Disaster Mitigation Act (DMA) of 2000 amended the Robert T. Stafford Disaster Relief and Emergency Assistance Act of 1988. The DMA authorized the creation of a pre-disaster mitigation program to make grants to State, local and tribal governments. It also includes a provision that defines mitigation planning requirements for State, local and tribal governments. This new section (Section 322) establishes a new requirement for local and tribal mitigation plans; authorizes up to 7 percent of the HMGP funds available to a State to be used for development of State, local and tribal mitigation plans; and provides for States to receive an increased percentage of HMGP funds from 15 percent to 20 percent if, at the time of the disaster declaration, the State has in effect a FEMA approved State Mitigation Plan that meets the criteria established in regulations.

The Pre-Disaster Mitigation (PDM) program was authorized by §203 of the Robert T. Stafford Disaster Assistance and Emergency Relief Act (Stafford Act), 42 USC. Funding for the program is provided through the National Pre-Disaster Mitigation Fund to assist States and local governments (to include Indian Tribal governments) in implementing cost-effective hazard mitigation activities that complement a comprehensive mitigation program.

All Applicants and Sub-applicants must be participating in the National Flood Insurance Program (NFIP) if they

have been identified through the NFIP as having a Special Flood Hazard Area (a Flood Hazard Boundary Map (FHBM) or Flood Insurance Rate Map (FIRM) has been issued). In addition, the Applicant/Sub-applicant must not be withdrawn, suspended, or on probation from the NFIP.

As of November 1, 2004, states and Indian tribal governments that choose to apply directly to FEMA must have an approved mitigation plan to be eligible to receive project grant funding under the PDM program. In addition, as of November 1, 2003, local governments, Indian tribal governments applying as Sub-applicants, and universities must have a FEMA-approved mitigation plan to be eligible to receive project grant funding under the PDM program. PDM planning grants will continue to be available to states, Indian tribes, local governments, and universities that do not have a FEMA-approved Mitigation Plan to enable them to meet the planning requirements. 44 CFR Part 201, Hazard Mitigation Planning, establishes requirements for state, tribal, and local hazard mitigation planning.

### *4) Repetitive Loss Property Strategy*

The primary objective of the Repetitive Loss Properties Strategy is to eliminate or reduce the damage to property and the disruption of life caused by repeated flooding of the same properties. A specific target group of repetitive loss properties is identified and serviced separately from other NFIP policies by the Special Direct Facility (SDF). The target group includes every NFIP-insured property that, since 1978 and regardless of any change(s) of ownership during that period, has experienced:

- a) Four or more paid flood losses of more than \$1,000 each; or
- b) Two paid flood losses within a 10-year period that, in the aggregate, equal or exceed the current value of the insured property; or
- c) Three or more paid losses that, in the aggregate, equal or exceed the current value of the insured property.

The loss history includes all flood claims paid on an insured property, regardless of any change(s) of ownership, since the building's construction or back to 1978 if the building was constructed before 1978. Target group policies are afforded coverage, whether new or renewal, only through the SDF.

At least 90 days before the policy renewal date, affected property owners and their flood insurance agents are sent notice by the Write Your Own (WYO) company stating that the policy is ineligible for renewal through the WYO Program and offering renewal in the SDF. A follow-up notice is sent by the SDF 45 days before the renewal date. The policyholder should renew the NFIP policy with the SDF, not with the present WYO company.

Policyholders who believe that their property has not sustained the loss history indicated by the NFIP may appeal in writing to the SDF. All documentation to substantiate the appeal must be included. Until the appeal is settled, the policy will remain in the SDF. If the appeal is successful, the policy will be transferred back to the WYO company that previously serviced it. The policyholder will be notified of the results of the appeal.

The appropriate FEMA Regional Office provides information about the property to state and local floodplain management officials. States or communities may sponsor projects to mitigate flood losses to these properties or may be able to provide technical assistance on mitigation options. Depending on individual circumstances, appropriate mitigation measures commonly include elevating buildings above the level of the base flood, demolishing buildings, and removing buildings from the SFHA. Sometimes, mitigation takes the form of a local drainage-improvement project that meets NFIP standards.

If a property owner agrees to undertake appropriate mitigation measures, then the property will be removed from the target group at the next renewal, and the

policy then will be transferred from the SDF to the WYO company that previously serviced the policy.

## **E. PROVIDING ASSISTANCE TO NFIP COMMUNITIES FOR FEDERALLY DECLARED DISASTERS**

First Response to a disaster is the job of local government's emergency services with help from nearby municipalities, the state and volunteer agencies. In a catastrophic disaster, and if the governor requests, federal resources can be mobilized through the Federal Emergency Management Agency (FEMA) for search and rescue, electrical power, food, water, shelter and other basic human needs.

It is the long-term Recovery phase of disaster which places the most severe financial strain on a local or state government. Damage to public facilities and infrastructure, often not insured, can overwhelm even a large city. A governor's request for a major disaster declaration could mean an infusion of federal funds, but the governor must also commit significant state funds and resources for recovery efforts.

A Major Disaster Declaration usually follows these steps:

- Local Government Responds, supplemented by neighboring communities and volunteer agencies. If overwhelmed, turn to the state for assistance;
- The State Responds with state resources, such as the National Guard and state agencies;
- Damage Assessment by local, state, federal, and volunteer organizations determines losses and recovery needs;
- A Major Disaster Declaration is requested by the governor, based on the damage assessment, and an agreement to commit state funds and resources to the long-term recovery;
- FEMA Evaluates the request and recommends action to the White House based on the disaster, the local community and the state's ability to recover;
- The President approves the request or FEMA informs the governor it has been denied. This decision process could take a few hours or several weeks depending on the nature of the disaster.

There are basically two types of disaster assistance that are available. One is paid to private citizens and business owners (i.e., individual assistance) while the other is paid to government entities and institutions (i.e., public assistance).



*1) Public Assistance - for repair of infrastructure, public facilities and debris removal.*

Public Assistance is aid to state or local governments to pay part of the costs of rebuilding a community's damaged infrastructure. Generally, public assistance programs pay for 75 per cent of the approved project costs. Public Assistance may include debris removal, emergency protective measures and public services, repair of damaged public property, loans needed by communities for essential government functions and grants for public schools.

FEMA has the following guides to assist local officials with the requirements of FEMA's Public Assistance Program:

- FEMA 321 – Public Assistance Policy Digest
- FEMA 322 – Public Assistance Guide
- FEMA 323 – Applicant Handbook
- FEMA 325 – Debris Management Guide

*2) Individual Assistance - for damage to residences and businesses or personal property losses.*

Immediately after the declaration, disaster workers arrive and set up a central field office to coordinate the recovery effort. A toll-free telephone number is published for use by affected residents and business owners in registering for assistance. Disaster Recovery Centers also are opened where disaster victims can meet with program representatives and obtain information about available aid and the recovery process.

Disaster aid to individuals generally falls into the following categories:

- Disaster Housing may be available for up to 18 months, using local resources, for displaced persons whose residences were heavily damaged or destroyed. Funding also can be provided for housing repairs and replacement of damaged items to make homes habitable.
- Disaster Grants are available to help meet other serious disaster related needs and necessary expenses not covered by insurance and other aid programs. These may include replacement of personal property, and transportation, medical, dental and funeral expenses.

Low-Interest Disaster Loans are available after a disaster for homeowners and renters from the U.S. Small Business Administration (SBA) to cover uninsured property losses. Loans may be for repair or replacement of homes, automobiles, clothing or other damaged personal property. Loans are also available to businesses for property loss and economic injury.

Other Disaster Aid Programs include crisis counseling, disaster-related unemployment assistance, legal aid and assistance with income tax, Social Security and Veteran's benefits. Other state or local help may also be available.

### Assistance Process

After the application is taken, the damaged property is inspected to verify the loss. If approved, an applicant will soon receive a check for rental assistance or a grant. Loan applications require more information and approval may take several weeks after application. The deadline for most individual assistance programs is 60 days following the President's major disaster declaration.

Audits are done later to ensure that aid went to only those who were eligible and that disaster aid funds were used only for their intended purposes. These federal program funds cannot duplicate assistance provided by other sources such as insurance.

After a major disaster, FEMA tries to notify all disaster victims about the available aid programs and urge them to apply. The news media are encouraged to visit a Disaster Recovery Center, meet with disaster officials, and help publicize the disaster aid programs and the toll-free tele-registration number.

#### Some additional facts about disaster assistance for flooding events:

- Most forms of federal disaster assistance require a Presidential declaration.
- Federal disaster assistance declarations are awarded in less than 50% of flooding incidents.
- There is a 26% chance of experiencing a flood during the life of a 30-year mortgage compared to a 4% chance of a fire.
- Uninsured flood victims will most likely have to buy flood insurance as a condition of a federally-backed disaster loan or grant.
- The most typical form of disaster assistance is a loan that must be repaid with interest.
- The duration of a Small Business Administration (SBA) disaster home loan is approximately 30 years.
- The average Individuals and Households Program award is about \$4,000.
- Repayment on a \$50,000 SBA disaster home loan is \$240 a month or \$2,880 annually at 4% interest.

## 2.3 State NFIP Coordinator's Roles and Responsibilities

### A. LEGISLATIVE AUTHORITY TO IMPLEMENT FLOODPLAIN MANAGEMENT

In 1989 Virginia's General Assembly enacted the Virginia Flood Damage Reduction Act. Under the Flood Damage Reduction Act §10.1-602 (Code of Virginia) and the Governor's Memorandum 2-97 "Floodplain Management for State Agencies" (dated July 1, 1997) the powers and duties of Department of Conservation and Recreation (DCR) are established and the Manager of the Floodplain Program designated as the State Coordinator for the National Flood Insurance Program (NFIP). The Floodplain Management Program is part of the Division of Dam Safety and Floodplain Management.

The Virginia Flood Damage Reduction Act, Code of Virginia §10.1-602, empowers DCR with floodplain management (or flood protection) powers and duties and is stated as follows:

1. Develop a flood protection plan for the Commonwealth. This plan shall include:
  - a. An inventory of flood-prone areas,
  - b. An inventory of flood protection studies,
  - c. A record of flood damages,
  - d. Strategies to prevent or mitigate flood damage, and
  - e. Information relating to flooding and floodplain management.
2. Serve as the coordinator of all flood protection programs and activities in the Commonwealth, including the coordination of federal flood protection programs administered by the United States Army Corps of Engineers, the United States Department of Agriculture, the Federal Emergency Management Agency, the United States Geological Survey, the Tennessee Valley Authority, other federal agencies and local governments.

3. Make available flood and flood damage reduction data to localities for planning purposes, in order to assure necessary local participation in the planning process and in the selection of desirable alternatives which will fulfill the intent of this article. This shall include the development of a data base to include (i) all flood protection projects implemented by federal agencies and (ii) the estimated value of property damaged by major floods.
4. Assist localities in their management of flood plain activities in cooperation with the Department of Housing and Community Development.
5. Carry out the provisions of this article in a manner which will ensure that the management of flood plains will preserve the capacity of the flood plain to carry and discharge a hundred year flood.
6. Make, in cooperation with localities, periodic inspections to determine the effectiveness of local flood plain management programs, including an evaluation of the enforcement of and compliance with local flood plain management ordinances, rules and regulations.
7. Coordinate with the United States Federal Emergency Management Agency to ensure current knowledge of the identification of flood-prone communities and of the status of applications made by localities to participate in the National Flood Insurance Program.
8. Establish guidelines which will meet minimum requirements of the National Flood Insurance Program in furtherance of the policy of the Commonwealth to assure that all citizens living in flood-prone areas may have the opportunity to indemnify themselves from flood losses through the purchase of flood insurance under the regular flood insurance program of the National Flood Insurance Act of 1968 as amended.

9. Subject to the provisions of the Appropriations Act, provide financial and technical assistance to localities in an amount not to exceed fifty percent of the nonfederal costs of flood protection projects.

The Act continues to specify state agency compliance in §10.1-603 by stating that:

“All agencies and departments of the Commonwealth shall comply with the flood plain regulations established pursuant to this article when planning for facilities in flood plains.”

The Flood Prevention and Protection Assistance Fund was established in 1989 by the General Assembly to assist any city, county, town, water authority, or taxing district for the purpose of assisting localities in the development and implementation of flood prevention or protection projects or for flood prevention or protection studies. The Virginia Flood Damage Reduction Act §10.1-603.16 through §10.1-603.23 states how the fund is to be administered and that the assistance shall not exceed 50% of the cost of the project or study.

## **B. LIAISON BETWEEN FEMA AND LOCAL OFFICIALS**

The Floodplain Management Program serves as a liaison between Virginia communities and FEMA to help local officials continue proper implementation of floodplain ordinances. DCR staff work with Virginia's counties, cities and towns to establish and enforce floodplain management zoning. The Program has model ordinances that set minimum standards for local regulations and are used by localities in development of their floodplain ordinances. The local governments can set more restrictive standards to ensure higher levels of protection for citizens located in flood hazard areas.

## **C. ESTABLISH AND DEVELOP BUILDING STANDARDS TO MEET NFIP REQUIREMENTS**

Through the Virginia Uniform Statewide Building Code (VUSBC), the state has set construction standards for structures built in FEMA's special flood hazard areas. The current (2003) VUSBC is compliant with the 2000 International Code Series (I-Codes) including the International Building Code and the International Residential Code. The VUSBC addresses the following NFIP requirements:

- 60.3(a)(3)(i) - construction and substantial improvements to be designed and adequately anchored to prevent flotation, collapse, or lateral movement;
- 60.3(a)(3)(ii) – new construction and substantial improvements to be constructed with materials resistant to flood damage;
- 60.3(a)(3)(iv) - electrical, heating, ventilation, plumbing, and air conditioning equipment and other service facilities to be designed and/or located to protect components;
- 60.3(a)(6)(i) - new/replacement sanitary sewage system designed to minimize/eliminate infiltration/discharges; (ii) onsite waste disposal systems located to avoid impairment or contamination;
- 60.3(b)(1) – require permits for all development, including placement of manufactured homes;
- 60.3(b)(5) - where flood elevation data are provided: (i) obtain lowest floor elevation of new and substantially improved structures; (ii) for floodproofed non-residential structures, obtain elevation to which structure was floodproofed; (iii) maintain records of elevations;
- 60.3(b)(8) – require installation of MFH using methods to minimize flood damage, including anchoring, and to resist wind forces;
- 60.3(c)(2) - require all new and substantially improved structures to have the lowest floor elevated to or above the flood elevation;
- 60.3(c)(3) - for nonresidential structures: (i) lowest floor; elevated, or (ii) floodproofed (including utility and sanitary facilities);
- 60.3(c)(4) - for floodproofed nonresidential structures: (i) registered design professional to develop and/or review the structural design and certify; (ii) certification retained in records;
- 60.3(c)(5) – fully enclosed areas below elevated buildings are to be: limited in use (parking, access, storage), provided with flood openings that meet minimum criteria or are designed and certified by a registered design professional;

- 60.3(d)(3) – prohibit floodway encroachment unless no impact on flood levels is demonstrated;
- 60.3(e)(4) - require all new and substantially improved construction to be elevated on pilings and columns so that: (i) bottom of lowest horizontal structural member of the lowest floor is at or above the flood elevation, (ii) pile or column foundation and structure are anchored to resist flotation, collapse and lateral movement due to wind and water loads; registered design professional to develop or review the design, specifications and plans and provide certification; and
- 60.3(e)(5) – enclosed areas, if any, are to be constructed with nonsupporting, breakaway walls, lattice, or screening intended to collapse under wind and water loads; uses limited to parking, building access, or storage.

## **D. PROVIDES TECHNICAL ASSISTANCE TO LOCAL OFFICIALS AND CITIZENS TO ENSURE COMPLIANT DEVELOPMENT**

DCR staff also provide technical assistance through review of floodplain ordinances, local flood studies and other technical engineering documents involving potential development in the regulated floodplain. Training in workshops or one-on-one formats is available to community staffs on a variety of topics including the NFIP, hazard mitigation, Community Rating System and floodplain management related building code enforcement. Staff assist communities seeking assistance in re-mapping their floodplains, assistance in development of hazard mitigation strategies, and reduction of risks to structures in the flood hazard areas through several state and federal grant programs. Other means of assistance and training are also provided to citizens, engineers, consultants, surveyors, developers, realtors and insurance agents with questions on flood insurance rate maps, flood-proofing techniques, construction methods, and ordinance or building code interpretation.

## **E. EVALUATES AND DOCUMENTS LOCAL FLOODPLAIN MANAGEMENT ACTIVITIES FOR COMPLIANCE**

Typically, DCR staff annually visit or contact 60 to 80 of the 270 NFIP communities in Virginia to assure proper floodplain management ordinance enforcement, continued understanding of floodplain management issues, and awareness/training of new or updated FEMA programs. Through Community Assistance Visits (CAVs) or Community Assistance Contacts (CACs), DCR staff and local program administrators review a community's floodplain management ordinance, zoning and comprehensive planning process, building code enforcement system and emergency preparedness system for localized flooding.

## **F. PROVIDES TECHNICAL TRAINING AND INFORMATIONAL WORKSHOPS**

DCR provides community education encompassing a variety of strategies and responds to individuals requesting assistance and understanding of floodplain regulations and flood insurance. Flood insurance is the primary way for property and home-owners to minimize the economic impacts of flooding and DCR continues to educate Virginia's insurance industry on its responsibilities to provide insurance policies.

## **G. PROMOTES OTHER FEMA PROGRAMS**

DCR's Floodplain Management Program is actively involved in multiple FEMA programs through either implementation or promotion them. The following list briefly describes the role DCR has with each FEMA program:

- CAP-SSSE – DCR is responsible for full implementation of this program in the Commonwealth and has two full time positions funded to adjudicate its objectives.
- MMMS – DCR has taken on responsibilities for implementing the Map Modernization Program in Virginia.
- CTP – DCR is a mapping partner with FEMA through this program and assists in the

- CIS – As part of its Annual CAP-SSSE Agreement, DCR routinely provides

- MNUSS –
- FMA -

## **H. PROVIDES ASSISTANCE DURING FEDERALLY DECLARED DISASTERS**

Flooding is the greatest threat of all natural hazards in Virginia, accounting for more than 90% of Virginia's declared disasters. Damage from flooding since the 1950's indicates that Virginia experiences more than \$400 million in damages each decade and during the past decade more than \$100 million annually. Flood hazard mitigation is a primary goal of the program.

During the past decade there have been 11 presidentially declared disasters that have resulted from flooding. These include (1) severe weather in the Central Shenandoah Valley during the Summer of 1995, (2) Hurricane Fran in the Central Shenandoah Valley and northern Blue Ridge Mountains during the Fall of 1996; (3) Snow melt throughout the Commonwealth during the Winter of 1996; (4) Hurricane Floyd in eastern Southside and Tidewater Virginia during the Fall of 1999; (5), (6), (7) severe weather in Southwest Virginia during the Summer of 2001, Spring of 2002, Spring of 2003; (8) Hurricane Isabel across two-thirds of the Commonwealth (east of Roanoke) during the Fall of 2003; (9) severe weather in the Roanoke Valley during the Spring of 2004; (10) Tropical Depression Gaston in the Richmond Metro Area during late Summer of 2004; and (11) Tropical Storm Jeanne in Southwest Virginia and Roanoke Valley during the Fall of 2004.

The Program's staff has provided technical and administrative assistance to the Virginia Department of Emergency Management (VDEM) and FEMA. Also, DCR staff coordinates with the VDEM to administer the FEMA Flood Mitigation Assistance Program, which provides an annual source of flood mitigation funding, and provide technical support during Hazard Mitigation Grant Program (HMGP) project selections and administration.

## 2.4 LOCAL FLOODPLAIN ADMINISTRATION

### A. ADOPT AND ENFORCE A FLOODPLAIN MANAGEMENT ORDINANCE

Once FEMA provides a community with the flood hazard information upon which floodplain management regulations are based, the community is required to adopt a floodplain management ordinance that meets or exceeds the minimum NFIP requirements. FEMA can suspend communities from the Program for failure to adopt once the community is notified of being flood-prone or for failure to maintain a floodplain management ordinance that meets or exceeds the minimum requirements of the NFIP. The procedures for suspending a community from the Program for failure to adopt or maintain a floodplain management ordinance that meets or exceeds the minimum requirements of the NFIP are established in the NFIP regulations at 44 CFR §59.24(a) and (d).

Since 1968, just over 2,300 communities have been suspended for failure to adopt. Most of these communities subsequently adopted a compliant ordinance and were eventually reinstated into the Program. A community either has or does not have a compliant ordinance. As of August 2002, there were 261 communities suspended from the Program for failure to adopt floodplain management regulations that meet or exceed the minimum NFIP requirements. These are generally small communities with little or no floodplain development.

### B. ASSIGN LOCAL OFFICIAL RESPONSIBILITY FOR FLOODPLAIN MANAGEMENT ORDINANCE ENFORCEMENT

NFIP regulations in Section 59.22(b)(1) require a community to designate an official with the responsibilities, the authority, and the means to implement the ordinance the community has adopted in compliance with the NFIP. (The process for adopting an ordinance is discussed in Chapter 3.) The designation

of an administrator should be incorporated into the text of the local floodplain management ordinance.

In many small communities, the position of floodplain administrator is part-time, and the duties are added to the responsibilities of an existing official, such as the building inspector, zoning administrator, auditor, or clerk. The governing board of the political subdivision must take steps to ensure that the floodplain administrator has the cooperation and support of all other community officials and departments in implementing the floodplain ordinance.

Fair administration is the key to a successful permit system. To ensure fair administration, the person selected as the floodplain administrator should be technically qualified (with some knowledge of construction) and should understand the NFIP. The floodplain administrator also must have the support of the local governing body.

The duties of the local floodplain ordinance administrator are listed below and discussed in greater detail in other parts of this chapter:

- understanding the permit system and making permit application forms available to prospective developers;
- reviewing permit applications to determine whether or not they are in compliance with the ordinance and whether they would negatively impact the floodway or the flow-carrying capacity;
- estimating base-flood elevation when the FIA has not provided base-flood elevation data, and obtaining the best available data from other sources to use in reviewing permits;
- interpreting boundaries when there is a conflict between FIA flood maps and actual field conditions;
- acting on permit applications (approve, conditionally approve, or deny);
- issuing variances under certain conditions;
- enforcing ordinances, which includes follow-up inspections on all permits granted;
- addressing violations by working with the community's attorney and informing citizens of the penalties of noncompliance with NFIP requirements;

- keeping records, including the floodplain ordinance, maps, the flood insurance study, NFIP regulations, and project files for developments;
- filing reports, including the Biennial Report that must be submitted to FEMA every two years (see sample in Appendix B);
- maintaining the flow-carrying capacity for watercourse alterations; and
- notifying neighbors of watercourse alterations.

### C. HAVE A LOCAL FLOODPLAIN DEVELOPMENT PERMITTING PROCESS

The NFIP does not allow construction or development in an identified flood-hazard area without a permit from the community. This regulation, which is located in section 60.3(b)(1), states that the community must “Require permits for all proposed construction and other developments including the placement of manufactured homes” within special flood-hazard areas.

It is important to note that the concept of development goes beyond the traditional building permit. While the building permit is limited to buildings, the development permit includes buildings and alterations to landscape, such as excavation or use of fill—any change that would affect drainage patterns or the flood-carrying capacity of the watercourse.

Permits are required for the following situations in flood-hazard areas:

- building or enlarging a structure;
- placing a manufactured home on a site; and
- mining, dredging, filling, grading, paving, excavating, or drilling.

Specifically, all structural projects need a permit - buildings, manufactured homes, storage facilities, dams, and dikes. There is some latitude for nonstructural activities, depending on their type, magnitude, and location.

For example, a clearing or grading project that removes vegetation or pushes soil into the river may

alter normal channel flow or increase flood heights, and thus would require a permit. On the other hand, a small picket fence is unlikely to affect flooding and would not require a permit.

In determining whether a permit is required, the deciding factor should always be whether a development could possibly increase or alter the flood hazard.

This means that your community may issue a permit only if the proposed development meets the standards of the NFIP outlined in Chapter 4.

### D. OPTIONS FOR ACTING ON A PERMIT APPLICATION

After you complete your review of a development permit application, the next step is to take action. You have three options for action.

#### Approving the Permit Application

If a permit application describes a development that will be built in compliance with the floodplain ordinance, you may give your approval simply by marking the appropriate box on the application form, signing it, and providing a copy to the applicant.

#### Conditionally Approving the Permit

If the permit application describes a development that would be in violation of the floodplain ordinance, you should conditionally approve the application, if the applicant agrees to modify the development.

A permit is required for any structural or nonstructural activity that may affect flooding or flood damage.

For example, if the proposed development is a house with a basement in an unnumbered A Zone, you may issue a permit only if the house is built without a basement, and the lowest floor meets the elevation requirements.

In cases where simple modifications will bring an application into compliance with the ordinance, you should work with the applicant to iron out the problems with the development.

### **Denial of Permit**

When a permit application is in violation of the floodplain ordinance, you must deny the permit and explain to the applicant why it was denied.

An applicant whose permit has been denied has three options:

- redesign the development so that it meets the standards of the NFIP;
- appeal the decision to the local governing body, if the floodplain administrator appears to be in error; or
- request a variance to the ordinance, if the ordinance causes an undue hardship that can be justified.

## **E. ISSUANCE OF VARIANCES**

The primary goals of your floodplain management ordinance are to reduce damage and to protect public health and safety for the entire community. Very few variances to the ordinance can be justified if proposed activities increase the susceptibility of buildings and people to flooding.

For the purposes of the National Flood Insurance Program, a variance is a grant of relief from the strict application of the standards in the regulations. It is granted for floodplain management purposes only. Flood insurance will still be rated according to risk and could be very expensive (see below). In addition, issuing a grant for an individual that would put that person and their property at a higher risk for safety

could unnecessarily expose the community to future litigation if that person was injured or their property was damaged as a result of a flood event.

Public safety and flood damage reduction are the fundamental reasons for regulating floodplain development. If an applicant requests a waiver or reduction of the elevation requirement, the individual hardship must be weighed against the public merit of protecting citizens against the dangers and damages of flooding. Only a truly exceptional and unique hardship should persuade a Board to set aside those public purposes.

Sometimes, personal circumstances may prompt compassion, but the hardship is not sufficient to justify deviation from the requirements. Buildings typically last long after a personal hardship ceases to exist. Building to a lesser standard can create safety and financial problems for future owners.

Occasionally, property owners seek variances to the NFIP elevation requirement in order to simplify handicap access. This hardship is considered personal in nature, and a variance would raise a critical public safety concern. A disabled person may be unable to evacuate during a flood emergency. In some variance cases, applicants may be better advised to seek a variance to other standards that have less impact on public safety, such as lot line setbacks or building height restrictions.

### **Guidance for Issuing Variances**

A variance should pertain to the unique characteristics of the land itself. A properly issued variance may be granted for a parcel of property with physical characteristics so unusual that complying with the ordinance would create exceptional hardship for the applicant or surrounding property owners. A variance shall not be personal in nature and economic hardship to an individual is never an acceptable cause for issuing a variance.

In Virginia, it is generally not the role of the community's local floodplain administrator or any other department staff to issue a variance to local ordinances or building codes. The responsibility typically belongs to an elected or appointed board such as the Board of Zoning Appeals or the Building Code Appeals Board (Board). However, it is the responsibility of the local floodplain administrator and other community staff involved with enforcement of NFIP requirements to properly inform and advise these boards as to the very limited cases that variances for floodplain development can be issued.

The NFIP does not set out absolute criteria for granting variances. The best policy is to not grant variances unless they fit into the categories below, or unless there are compelling reasons that are consistent with the NFIP guidance.

If your ordinance is more restrictive than the NFIP, you can more easily consider variances down to the minimums. Be careful about being lenient because it sets a precedent for future requests. And if your community participates in the NFIP's Community Rating System, you run the risk of losing credit points if you too readily grant issue variances to your higher standards.

### **Criteria for Granting Variances**

The NFIP regulations (44 CFR §60.6) provide for granting variances in the following situations:

- A structure individually listed on the federal or State Register of Historic Places is not required to meet the elevation requirement when it is substantially improved, provided the modifications do not preclude continued designation as a historic structure.
- A functionally dependent use, in which the use of the building is absolutely dependent on its close proximity to water, need not meet the elevation requirement, provided that acceptable methods of wet flood-proofing are incorporated into the design.
- A new structure on a lot of one-half acre or less in size and contiguous to, and surrounded by, existing structures that are below flood level, provided all other variance criteria are met. The assumption is that a small lot may limit the options to meet all of the NFIP

requirements. Remember to consider elevation methods other than fill. In addition, where in-fill development is proposed, it may be appropriate to achieve some compatibility with surrounding buildings.

In granting a variance, the Board must consider the following factors:

- The applicant must show good and sufficient cause for a variance. The cause must pertain to limitations of the property, which do not allow reasonable use while meeting the requirements of the ordinance. The variance must not give an applicant any special benefits that are not enjoyed by other floodplain residents.
- The applicant must demonstrate that he will suffer hardship if denied the variance. It is important to emphasize that acceptable hardship must pertain to the characteristics of the land itself, not the applicant or occupant. It is difficult to imagine physical characteristics of the land that would justify a variance to the flood elevation requirement. Therefore, a variance should be very difficult to grant since other options must be considered and exhausted.
- The applicant must show that, if granted a variance, the proposed project will not cause increased flood heights, create additional threats to public safety, lead to extraordinary public expense, create nuisances, cause fraud on or victimization of the public, or conflict with other State and local laws or ordinances.
- The variance granted must be the minimum necessary, considering the flood hazard, to afford relief. The greater the hazard, the more difficult it should be to provide a variance. The Variance Board may modify a variance request to provide less relief than requested.
- Additional conditions may be added to mitigate possible detrimental effects of granting a variance. Other property owners must not be adversely affected in any material way.

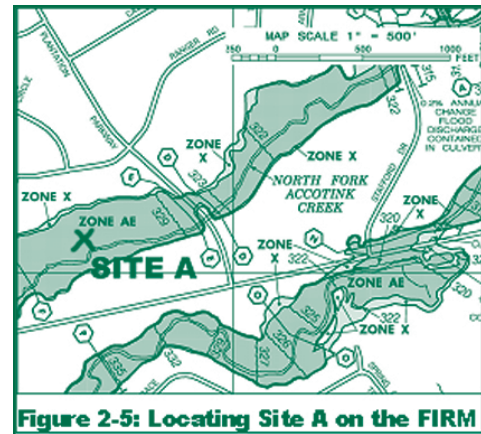
### Impact of Variances on Applicants (Including Flood Insurance)

The effect of a variance on flood insurance premiums should not be downplayed. The Board should request that an insurance agent provide an estimate of the cost of a policy if a variance is granted. A structure that is at greater risk to flooding will be rated according to the risk. Premiums may be as high as \$25 for each \$100 of coverage.

The Board must notify the applicant in writing that the issuance of a variance, especially to allow construction below the BFE, will result in increased premium rates and that there will be increased risks to life and property. The notification must also emphasize that the structure may be more susceptible to flooding. A copy of the notification must be maintained with a record of all variance actions. Since flood insurance is required by most mortgage lenders, prohibitively high rates can mean a home that is difficult or impossible to sell.

Buildings that are built below the base flood elevation will probably remain part of the community for 50 to 100 years. Fraud and victimization may occur if future owners who purchase the buildings are unaware that they are subject to increased risk and can be insured only at very high flood insurance rates. One option that the Board may consider to offset the likelihood of this is to require recording variances on property deeds so that title searches will disclose the facts to future buyers.

The Board must either grant or deny a variance request. If denied, then the property owner has the legal right to appeal in accordance with the procedures adopted by the community. If an appeal is denied, the property owner can seek relief through the court system. Before a case is presented to the court, all administrative and legislative remedies should be exhausted.



### F. BECOME FAMILIAR WITH FLOOD RISKS

The first question you must ask is whether or not the proposed development is in the special flood-hazard area. If this is not obvious, you should obtain the distance in the field between the proposed development site and one or more identifiable points (for example, the centerline of a street, a bridge, the river channel). Then, using the map scale, convert the distance from the identifiable point on the map to where the site is located to determine if it is in the special flood-hazard area.

As an example, look at Figure 2.5: Locating Site A on the FIRM. You can see that the proposed site is 700 feet southwest of the bridge for Plantation Parkway and 450 feet south of Ranger Road. You can then determine that it will be located in the special flood hazard area and must meet the requirements of your floodplain ordinance.

In order to review a permit application, you must know what the flood-hazard, or base-flood elevation, is at the development site. If you have the flood insurance rate map (FIRM) and the flood insurance study (FIS), the base-flood elevation (BFE) data for the development site is readily available.

If the FIS has not yet been supplied to your community with detailed technical data on the flood hazard, NFIP

regulations state that the local administrator must use the best available information to review permits. But where is this information available? For a start, see Chapter 3, “Flood Hazard Mapping”.

If there is no technical data available, you must use your judgment and be guided by the FHBM and by information from the following sources:

- Soil Conservation Service flood-hazard analyses;
- Army Corps of Engineers, floodplain information or other reports;
- Tennessee Valley Authority studies;
- U.S. Geological Service studies;
- historical information from newspaper articles and photos; and
- physical evidence, including high water marks on buildings, telephone poles, bridges, or other structures.

## **G. MAINTAIN FILES AND RECORDS OF DEVELOPMENT IN THE FLOODPLAIN**

Record keeping is an important responsibility for communities participating in the NFIP and an important duty of the local floodplain administrator. The following records must be kept on file and open for public use:

1. A complete and up-to-date copy of the floodplain ordinance, the flood map (FHBM or FIRM), and the Flood Insurance Study (FIS). If a FIS has not been completed, the community should obtain and maintain the best flood-hazard data available for the area and use it in regulating floodplain development.
2. The elevation of the lowest floor (including the basement) of all new or substantially improved structures in the special flood-hazard area, as required by NFIP regulations. For flood-proofed

structures, the elevation to which they have been flood-proofed must be obtained and recorded. Local floodplain administrators must require developers to complete an elevation certification to meet the NFIP requirement.

3. A project file for each development permit application. This file should contain:

- a copy of the permit application;
- a copy of the permit review checklist;
- copies of all pertinent correspondence relating to the project;
- documentation of inspections of the development; and
- base-flood elevation data for subdivisions of 5 acres or 50 lots or larger;
- pre- and post-construction certification forms for flood-proofing and post-construction certification forms indicating the lowest floor elevation of all structures;

4. Biennial Reports that must be submitted to FEMA every other year (see Appendix B). The Biennial Report will be easy to complete if this information is readily available in one place. It is also a good idea to keep the following information in this file:

- copies of previous years' reports;
- a running total of permits and/or variances granted in the flood-hazard area;
- maps of new annexations or other boundary changes;
- census data;
- record of any major natural or man-made changes affecting flooding patterns.

## **H. PROVIDE FOLLOW-UP FIELD INSPECTIONS TO ENSURE COMPLIANCE AND CHECK FOR UN-PERMITTED/NON-COMPLIANT DEVELOPMENT**

Every aspect of the floodplain permit should be checked in the field, including checking during stake-out that the building is correctly located on the site. This is especially important if the site is affected by more than one flood zone or different BFEs. The best time to collect the Elevation Certificate is during the foundation inspection when the lowest floor level is in place – but before further vertical construction takes place. Unless your community has frequent floodplain construction, your inspectors may not always be familiar with the specific requirements. Communities that do not have a building code should pay careful attention to inspections.

Local building code inspectors are the most likely to observe possible non-compliant development in the floodplain areas since they routinely travel from site to site throughout a community to conduct inspections. Those inspectors should be familiar with the requirements for compliant floodplain development, including that which doesn't require building permits. These activities may include fill, gravel/sand quarrying, bridge or culvert installation and other non-structural development. Any suspicious activities should be reported or permits verified with the proper department such as Engineering, Planning or Zoning.

## **I. RECORD MAINTENANCE**

The records you need to keep include all the supporting data for applications and for issued or denied permits and variances. Keep review notes and correspondence, copies of Elevation Certificates and Flood-proofing Certificates, floodway “no-rise” certifications and supporting data, permit review checklists, inspection reports, map change requests, and FEMA Letters of Map Change. Keep a log to record the number of floodplain development permits

issued – FEMA expects you to report this information from time to time. When you keep good records, you will help FEMA or the State when they come to conduct Community Assistance Visits.

## **J. ADDRESSING PERMIT VIOLATIONS**

Violations of the ordinance are often sensitive situations and require careful handling. Un-permitted activities are violations and you must require the owner to obtain the appropriate permits. Of course, violations of issued permits are easiest to address before final inspection and occupancy. But “passing” a final inspection does not mean that you can allow an existing violation to go uncorrected. You must take steps to ensure that violations are remedied.

Often, a letter to the property owner identifying the infraction and describing alternative ways to alleviate the problem will help. Sometimes you have to send a more severe letter outlining the civil or misdemeanor penalties. In extreme cases, you may need to pursue sanctions under Section 1316 of the NFIP regulations, which denies flood insurance coverage.

## **K. DEVELOP COMPREHENSIVE PLAN CONSISTENT WITH FLOODPLAIN ORDINANCE**

Often in a community's Planning Department there is little if any consideration given to the Floodplain Management Ordinance when developing a comprehensive plan. These plans can be a useful tool to help localities redirect development away from flood hazard areas or at least place limitations that will reduce the risk of property that is being developed.

## **L. NOTIFY FEMA AND STATE OF REVISIONS TO FLOOD HAZARD MAPS AND PROVIDE DATA TO FEMA**

A community's base flood elevations may increase or decrease resulting from physical changes (such as corporate annexations, fill in the regulatory floodplain, alterations to watercourses, etc.) that affect flooding conditions. As soon as practicable, but no more than six months after the date such information becomes available, a community is required to notify FEMA of the changes by submitting any applicable technical data describing the revision including maps and site plans. These submissions are necessary so that upon confirmation of those physical changes that affect flooding conditions, risk premium rates and flood plain management requirements will be based upon current data.

Local floodplain administrators are also encouraged to submit new technical data that may be obtained for new development in areas that previously did not have flood hazard areas mapped. If new data indicates areas that have 100-year floodplains, then flood insurance rates and floodplain management requirements should be based upon the latest information available once it is confirmed by FEMA.

## **M. ALTERATIONS OR RELOCATIONS TO WATERCOURSES AND NOTIFICATION OF FEMA, STATE AND ADJACENT PROPERTY OWNERS**

Changes in watercourses have the potential to significantly affect both upstream and downstream flood conditions. When a development permit is reviewed that includes a watercourse alteration - for example, the realignment or diversion of a stream, ditch, or river - the local floodplain administrator must be satisfied that the flow-carrying capacity of the watercourse will not be diminished. The permit applicant must supply a thorough description, including a set of plans and calculations, of the proposed alteration and its effect on flows.

Generally, an applicant should provide a topographic map of the area in question, a comparison of the existing and proposed channel capacity, a description of the proposed alteration, land use of adjacent properties, description of any obstructions, and photos of the area.

If the local official does not have the technical background to review such descriptions, then either technical staff another department, professional engineers/surveyors, or assistance from the State NFIP Coordinator should be utilized. Basic items that should be considered include:

- Hydraulic capacity of the watercourse. Will it be the same or greater after the alteration?
- Maintenance of the flow-carrying capacity of the watercourse. For example, if a new road is crossing a stream or coulee, culverts under the road must not place an undue constriction on the channel, causing floodwaters to back up.
- Maintenance of channel stability. Several factors relating to channel stability can influence or change a watercourse. For example, the alignment and grade of a channel or the channel coverage (concrete or clay vegetation) can affect the flow velocity. Steeper slopes and smooth surfaces may increase velocity, which in turn may cause erosion at the channel outlet, or may result in increased flood peaks. New curves in a channel may result in debris settling and, in time, reduce the channel capacity.

NFIP regulations require the local administrator to notify adjacent communities of any proposed watercourse alterations. Local government officials in these areas have an interest in water resources and must have the opportunity to review and comment on activities that may affect them.

You are also encouraged to notify the State NFIP Coordinator (DCR) of proposed alterations. FEMA needs to be notified about significant watercourse changes through use of an application for a Conditional Letter of Map Revision (CLOMR) because of the impact these physical changes have on the flood insurance study. Stream and river alternations should also be noted in FEMA's Biennial Reports.

#### **N. NOTIFY FEMA AND STATE OF ANY FLOODPLAIN ORDINANCE VARIANCES GRANTED BY LOCAL ELECTED OFFICIALS**

Communities are required to notify FEMA of any revisions that it makes to the local floodplain management ordinance. The State NFIP Coordinator's staff can assist a community making revisions to ensure that they are in compliance with the minimum standards of the NFIP regulations.

#### **O. DEVELOP POST-FLOOD STANDARD OPERATING PROCEDURES**

After a flood, whether big or small, you need to inspect the flooded area to check for damage. You might want to hand out flyers explaining permit requirements and how flood damage can be reduced in the future. Most homeowners do not know that they may need permits to repair and restore damage. Pay close attention to damage that may meet the "substantial damage" definition. As a rule-of-thumb, any building with more than 2' of water above the lowest floor should be carefully checked.

After a damage event of any kind, whether fire, tornado, earthquake, or even a truck running into a floodplain building, the NFIP requirements should prompt you to check for damage that may trigger the substantial improvement/substantial damage requirement.

You need to act quickly when you discover substantial damage because most owners want to fix things up right away and get back to "normal." Remember, if they've been damaged by flood, then "normal" means they'll get damaged again by the next flood. After major floods, you should be prepared to hand out information about getting permits and the benefits of Increased Cost of Compliance for buildings insured by the NFIP. You might want to set up a special service desk where people can get help. Contact the State NFIP Coordinator about post-disaster help when you have many permits to issue.

#### **P. ADDITIONAL TOOLS TO ASSIST LOCAL FLOODPLAIN MANAGEMENT ADMINISTRATORS**

##### **Elevation Certificate**

An Elevation Certificate is not required as part of the application, but you can use the application to advise the applicant that it is required when the lowest floor is built. It is good practice to have the applicant survey the lowest ground or grade next to the proposed foundation. Another good practice is to establish a temporary benchmark on the construction site so that the builder can easily check the elevation during construction of the foundation.

When you issue a permit to construct a building in the floodplain you should require the permittee to sign an agreement to provide the Elevation Certificate as soon as the foundation is constructed and the lowest floor elevation is established. Further, you can have the applicant agree that a final, as-built Elevation Certificate will be prepared prior to issuance of the occupancy certificate.

You must collect the Elevation Certificate – and determine that it is properly completed and shows compliance – before you issue the certificate of occupancy. Advise owners to keep the Elevation Certificate with their property deeds because the "as-built" Elevation Certificate is required for an insurance agent to prepare the most accurate insurance policy.

##### **Floodplain Management Permit Application**

A sample permit application is provided in Appendix D that can be tailored to meet your needs – just be sure to capture all of the critical information that you'll need to complete a thorough review for consistency with your ordinance. Appendix D also includes a sample permit review checklist. Development activities that don't involve buildings must also be issued permitted. Floodplain matters must be addressed during the

subdivision review, and proposals to alter waterways will require additional information from the applicant.

It's important that you flag all floodplain permit applications (and issued permits) to facilitate review, inspections, and file maintenance. One way to do this is to mark "FP" on files and the face of issued permits; another way is to use a different color folder. A separate log or database of floodplain permits will make it easier for you to complete FEMA's Biennial Report, and it will make your Community Assistance Visits go more smoothly.

Every permit application must have enough detail so that you can check to see if the proposed development is in, or out, of the Special Flood Hazard Area. Site plans must include scaled drawings to show the location of proposed activities and distances to landmarks such as road intersections and road crossings over streams.

Your ordinance and the application form should clearly specify certain information that must be included in applications. Specifically, site plans should show property lines, locations of existing and proposed structures, locations of streams and bodies of water, SFHA boundaries, floodway boundaries, Base Flood Elevations, existing and proposed ground elevations, proposed building elevation (lowest floor, including basement), and existing and proposed roads. You might find it valuable to have a pre-application meeting during which you should go over all of the requirements, especially the importance of the foundation inspection and confirming the as-built elevation of the lowest floor as soon as it is built.

Using checklists can help you review each permit application the same way and help make sure details aren't overlooked. Keep a copy of the checklist in the permanent permit file to document your review. A complete permit application is important. It is essential to obtain correct flood hazard information from FEMA's map products. After you decide the application has adequate and acceptable information, you should

complete the review steps, including:

- determine whether the development is in the SFHA and floodway;
- determine the BFE;
- avoid and minimize impacts; review proposed structures; and
- impose appropriate conditions.

Keep in the application file a copy of the FIRM that you used to make your determination.

## 2.5 LOCAL ELECTED OFFICIALS

Elected officials should make sure that floodplain management goals are consistent with community-wide planning and development goals and guidelines. Lending support to the local administrator will help smooth the permitting process. Elected officials also play a key role in informing the public about flood hazards and how to obtain information on flood insurance, building permits, and ways to make homes and businesses safer.

In 1996, a joint project of the Association of State Floodplain Managers, Inc., and the Federal Interagency Floodplain Management Task Force produced FEMA 309 - Addressing Your Community's Flood Problems: A Guide for Elected Officials. Complete with descriptions of real situations, this guide outlines how floods can affect communities, what elected officials can do before a flood, situations that come up after a flood, and resources available to help.

Local officials in America's 22,000 flood-prone jurisdictions, face a major dilemma. How should they plan now to be prepared for future floods? Should they do nothing and hope they won't have to answer to angry and confused citizens after a flood occurs? Unless a community has planned ahead, it will be very difficult to resolve tough issues during the chaotic and emotional period after a flood. The FEMA 309 Guide can help elected officials plan and take action to prepare their community for floods that will happen, either during your term in office or a later date. Everyone will benefit from that initiative. The following paragraphs are an excerpt from the Guide and provide a brief overview of the Guide.

As a local official, you may now have to deal with the consequences of those past decisions. You are likely the one who needs to provide leadership so that your constituents do not make the same mistakes in the future.

Unless there has been a recent flood, you may not know much about the actual flood risk in your community. You may not realize that many community problems and needs are closely connected to how its floodplain areas are used.

By recognizing the problems that floods can cause to your community and the resources that floodplains can provide, you can create opportunities for finding far reaching solutions to flooding and other, related issues. You can do this by:

- Understanding where flooding occurs in your community and why.
- Understanding the benefits that floodplains can provide to your community.
- Leading an investigation of the best ways your community can avoid flood damage and maximize the potential of your floodplains.
- Providing leadership in setting goals, implementing them, coping with a flood disaster, and supporting wise flood recovery measures.
- Ensuring the public health and safety of your constituents - always your primary concern.
- Setting a positive public example.
- Keeping long-range, community-wide goals in mind and balancing them against potential short-term economic gains.
- Making sure that all available local resources are used wisely.
- Obtaining technical and financial assistance when needed.
- Building support for your community's vision of its future floodplains.

There are many different kinds of floodplains and flood problems. But experience has shown that certain techniques and activities usually reduce flood damage and make the most of floodplain lands no matter what the situation. This document shares with you some of the problems, opportunities, and techniques that have brought success to other communities like yours.

## CHAPTER 3: FLOOD HAZARD MAPPING

### 3.1 FEMA'S MAP MODERNIZATION PROGRAM

Floods inflict more damage and economic losses on the United States than any other type of natural disaster. During the 10 years from fiscal year (FY) 92 through FY01, flooding caused more than 900 deaths and inflicted in excess of \$55 billion in damages. For decades, the national response to flood disasters generally was limited to flood control works such as levees and dams, and providing disaster relief to flood victims. This approach neither reduced losses nor discouraged unwise development. In fact, in some instances, it actually may have encouraged additional development. To compound the problem, the public often could not buy flood coverage from insurance companies, and building techniques that could reduce flood damage often were overlooked. In the face of mounting flood losses and escalating disaster relief costs to the general taxpayer, the U.S. Congress created the National Flood Insurance Program (NFIP).

The Federal Emergency Management Agency (FEMA) is the Federal agency with primary responsibility for assisting local and state governments, private entities, and individuals in preparing for, mitigating, responding to, and recovering from natural disasters, including floods. The NFIP is the key component of FEMA's efforts to minimize or mitigate the damage and financial impact of floods on the public, and to limit Federal expenditures needed after floods occur.

The NFIP's objectives are to reduce flood damages and provide an insurance mechanism for those most in need of protection. To that end, FEMA has been identifying and assessing flood hazards, providing Special Flood Hazard Area (SFHA) information on maps, and setting national floodplain management requirements that are adopted and enforced by communities choosing to participate in the NFIP. Minimizing the flood risk for new and existing development has protected citizens' lives, property, and personal finances.

Currently, many people within the United States live along streams, coasts, or lakes for which flood hazards have not been identified on maps, or where the maps are dated and do not accurately portray the flood hazards. The flood hazard map panel inventory needs to be updated. With presidential and congressional support and anticipated 5 years of funding (FY04-FY08), FEMA has embarked on an effort to update the Nation's flood maps through Multi-Hazard Flood Map Modernization (Map Modernization).

## 3.2 ESTABLISHED STANDARDS FOR HYDROLOGIC AND HYDRAULIC MODELING

For regulating floodplain development, a map developed through hydrologic and hydraulic analysis (H&H) is used. The science of hydrology is used to determine the amount of water that a river or stream must convey for a given storm. This involves calculating the amount of runoff that can be expected to drain from the surrounding watershed.

The principles of hydraulics are applied to help determine how the river or stream channel will handle the flow and to what extent the excess water will spread over the floodplain when the flood is at its peak. Specialized computer programs are used to perform most hydrologic and hydraulic computations.

The advantage of using H&H analyses is that specific frequencies of flooding can be selected for delineating a floodplain. It is often difficult to associate the drawing of a floodplain based on soils, physiography, or vegetation, with a particular frequency of flooding. If applied properly, an H&H analysis provides a sound technical and legal basis for adopting and administering floodplain management regulations.

However, where an H&H analysis is too costly, or where adequate flood data are lacking, other types of maps can be used. Municipalities using these other types of maps are encouraged to incorporate ordinance provisions that require refinement of floodplain data whenever individual permit applications are considered.

Since the NFIP uses hydrologic and hydraulic analysis in preparing flood insurance studies, it is helpful for everyone involved in the preparing and administering floodplain management ordinances according to NFIP requirements to have a general understanding of how these maps are developed.

## 3.3 COMPONENTS SHOWN ON FLOODPLAIN MAPS

FEMA has prepared a pamphlet to show all of the components of maps and how to use them. A copy of *How to Read and Use a Flood Map*, FEMA 258, can be ordered from the FEMA Distribution Center (1-800-480-2520). FEMA's website ([www.fema.gov/fhm](http://www.fema.gov/fhm)) includes many pages about flood hazard mapping.

There is a significant amount of information that can be provided on a FIRM including a Legend and Key (see Figure 3-1). The FIRM also shows roads and highways, railroads, municipal boundaries, and streams.

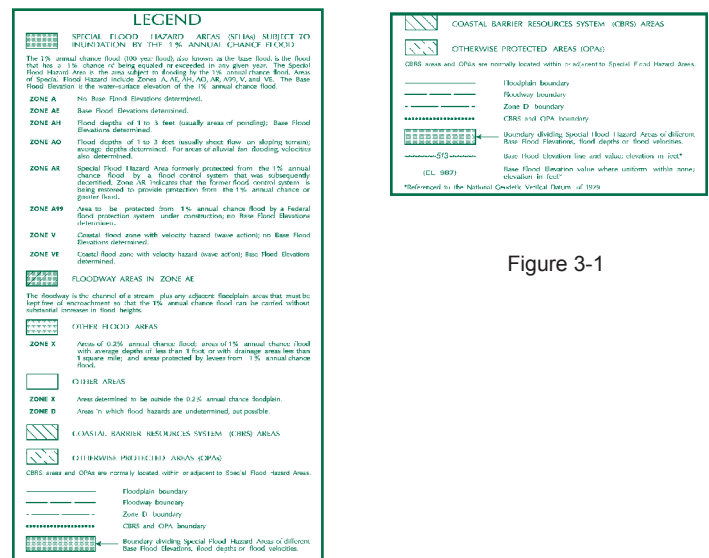


Figure 3-1

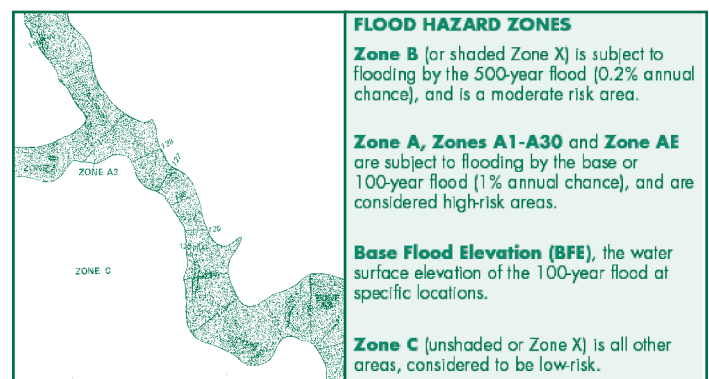


Figure 3-2

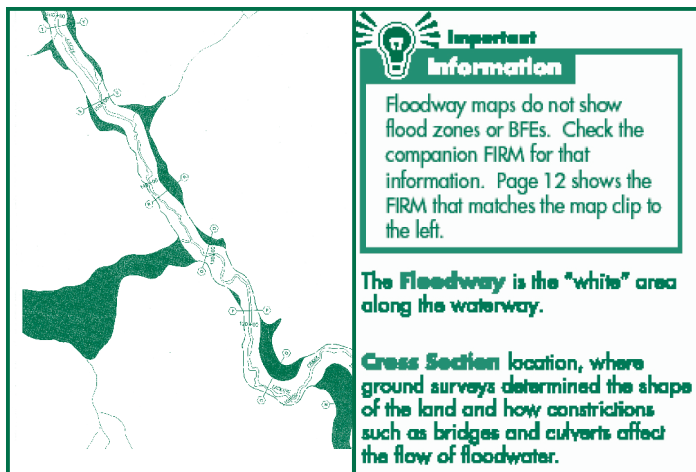


Figure 3-3

FEMA has transitioned its maps from maps that were manually developed or developed using non-GIS based software to a more "polished" format that also more accurately portrays the floodplain boundary and elevations. The FIRMs that are now commonly called "old format" are those that cover just one community. Figure 3-4 shows a piece from a old format FIRM.

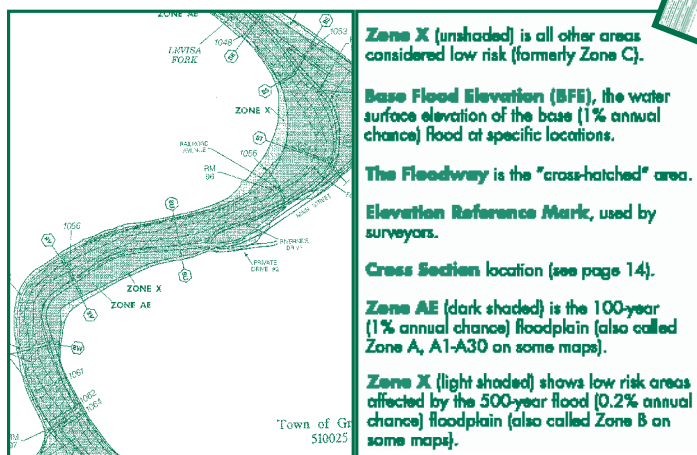


Figure 3-4

## A. MAP INDEX

When the map of a community is too large to fit on one map panel, a Map Index is prepared (the set of Floodway maps will have its own Map Index). Each panel is given a separate number. The Index shows the community boundary and highlights prominent features to help users select the right panel for closer examination. Features shown include major highways, railroads and streams. Figure 3-5 shows a Map Index for both the FIRM and Floodway maps.

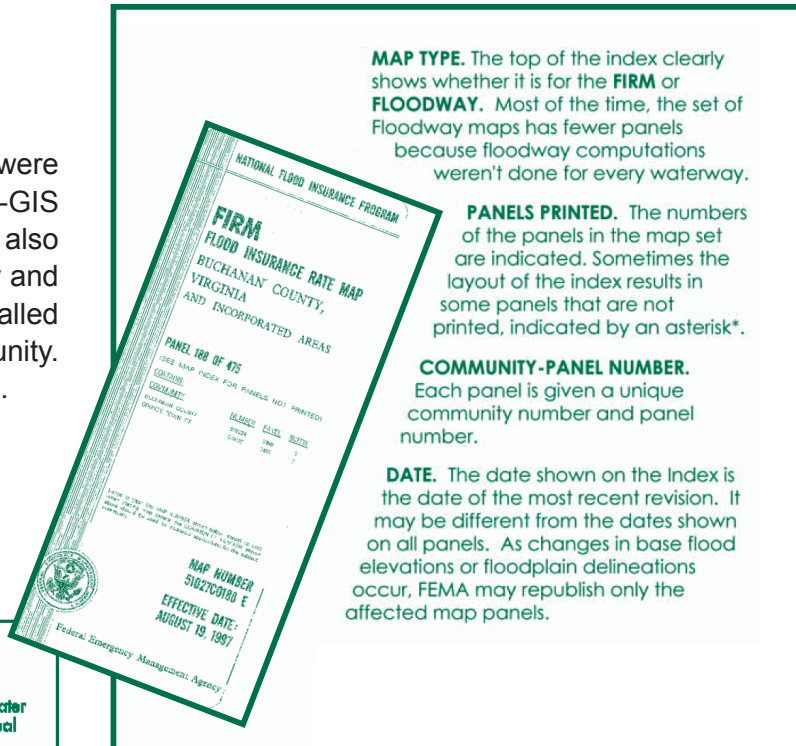


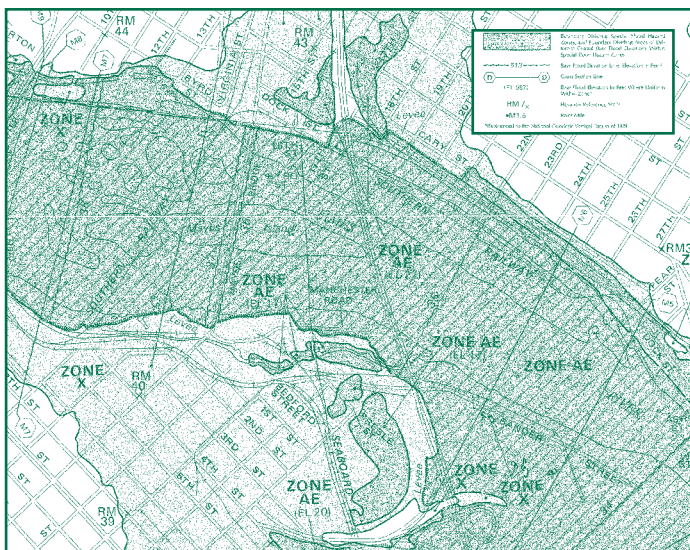
Figure 3-5

## B. BENCHMARKS AND REFERENCE MARKS

Most FIRMs show the locations of permanent benchmarks (BM) or temporary elevation reference marks (RM). The descriptions of the marks usually is found on each FIRM panel, although sometimes all descriptions are collected on one panel. Marks are referenced to a datum (National Geodetic Vertical Datum of 1929 or a more recent datum noted on the FIRM). Many local public works departments maintain lists of benchmarks.

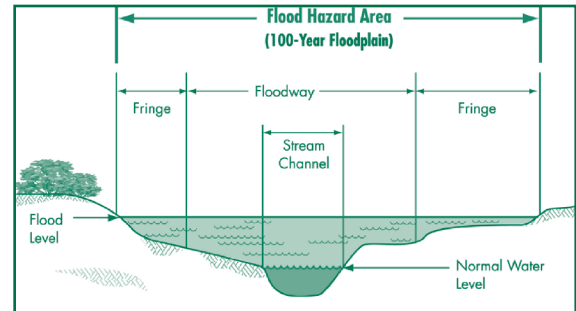
The Virginia State Geodetic Survey maintains records of all known permanent benchmarks that are plotted on the county geodetic control index maps. The Virginia Department of Transportation may have placed benchmarks or reference marks during construction of bridges. Contact the U.S. Geological Survey about benchmarks shown on federal maps.

It is not unusual to discover that reference marks shown on FEMA's maps are missing or inaccurate. Contact the State NFIP Coordinator to report errors.



## C. FLOODPLAIN BOUNDARIES

The floodplain boundaries that are shown on the FIRMs represent the location where the elevation (level) of the 100-year floodplain intersects the adjacent embankment (see Figure 3-7 below).



## D. FLOODPLAINS WITH AND WITHOUT BASE FLOOD ELEVATIONS AND THEIR SIGNIFICANCE

The FIRM that is produced as part of a FIS is also used for insurance purposes. It shows the identified floodplain areas and base-flood elevations that apply to a community. The base flood elevations and the structures location in relation to the floodplain are used by insurance agents in conjunction with standard NFIP rate tables to determine premium rates for existing and new structures.

An approximate floodplain will be shown on a FIRM as a Zone A. Base-flood elevations are not provided. As a result, development proposed within these areas need only be regulated based on Section 60.3(a) and (b) requirements of the NFIP Regulations.

A 100-year floodplain studied in detail is divided into two parts; the floodway and the flood fringe. The flood fringe is the remainder of the floodplain where floodwaters are shallow and slow moving. Base flood elevations for detailed areas are shown on the flood profiles contained in the FIS report. Development regulations applied to a floodplain studied in detail must, at a minimum, meet Section 60.3(c), (d), or (e) of the NFIP Regulations.

Along those stream segments studied in detail, the FIRM shows the cross sections where various measurements are taken of the floodway, and reference marks that can be used in determining elevations.

## E. FLOODWAYS

The floodway is that portion of the base flood where the greatest flood depths and velocities normally occur. The NFIP defines the floodway as the channel of the stream, plus adjacent floodplain areas that must be reserved to discharge the base flood without cumulatively increasing the water surface elevation more than a designated amount -- normally 1 foot.

Along many streams and rivers, the floodplain is shown as having two parts, the floodway and the flood fringe as shown in Figure 3-8. The floodway of a river or stream is the channel and adjacent land areas that are reserved to carry the discharge of the base flood. Development within the floodway is discouraged because it may block floodwaters and cause increased flooding on other properties. Anything proposed for the floodway must meet stringent criteria before a permit can be issued.

When a detailed flood study is performed, the design width for the floodway takes into account the surcharge that would occur if there are encroachments in the flood fringe (see Figure 3-8). However, the elevation that is shown on the FIRMs represents the pre-encroachment conditions because the encroachments are "future conditions". Since the primary function of FIRMs is for flood insurance rating purposes, the base flood elevations shown on them must represent current conditions.

**NOTE:** Here is an option to enhance the level of protection offered by the FIRMs: Have the area that is bounded by the intersection of the adjacent ground and the elevation of the BFE plus the Surcharge be shown on the communities FIRM as a shaded X Zone and have the same NFIP compliance requirements for development there as for in the regulatory floodplain.

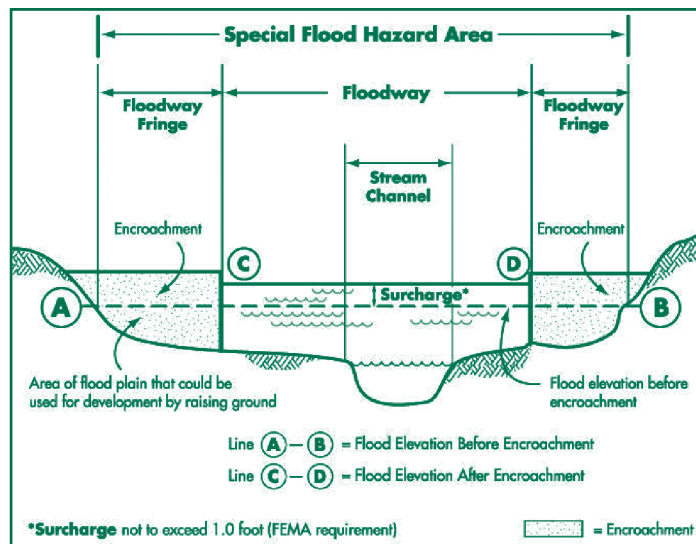


Figure 3-8

## F. FLOOD ZONES

The following designations for flood-hazard areas and flood risk zones will appear on the map

- Zone A, Zone AO, Zone AH, and Zone AE— correspond to the boundaries of the 100-year floodplain. They designate specific types of flood hazards or levels of determination: Zone A – No base flood elevation; Zone AE – Base flood elevations identified; Zone AH – Flood depths of 1 to 3 feet that are usually areas that pond and have base flood elevations shown; Zone AO – Flood depths of 1 to 3 feet that are usually sheet flow on sloping terrain or result from wave run-up in coastal areas having average depths shown.
- Zone X shaded—corresponds to the former Zone B located in the 500-year floodplain. Sometimes these shaded areas represent other types of flood hazards that can be designated by communities or the State through coordination with FEMA during the mapping process.
- Zone X un-shaded—corresponds to the previous Zone C. This zone typically represents areas that are outside of the 500-year floodplain and structures located in it are not subject to mandatory flood insurance requirements for federally backed loans.
- Zone V and VE – correspond to the coastal high hazard zones that are subject to high velocities and significant wave action (wave heights are greater than 3 feet). The V Zone has no base flood elevations determined, the VE-Zone does.

### 3.4 FLOOD INSURANCE STUDIES

In an urban or rapidly growing area, FIA prepares a flood insurance study (FIS), which provides more accurate and detailed flood information for a community to use in regulating floodplain development. A flood insurance study includes the following information:

- written report containing a description of a community's flooding conditions;
- flood profiles showing 500-, 100-, and 50-year flood elevations for each stream studied in detail;
- tabular data concerning the different characteristics of the floodway calculated for each cross section;
- flood boundary and floodway map (FBFM); and
- flood insurance rate map (FIRM).

When a FIS is received, the community enters the Regular Program of the NFIP, and additional insurance coverage is made available at actuarial rates. Upon entering the Regular Program, the community is required to adopt development regulations that at a minimum meet the requirements of NFIP Regulations for communities that have "final flood elevations for one or more special flood hazard areas on the community's FIRM and, if appropriate, has designated other special flood hazard areas without base flood elevations on the community's FIRM, but has not identified a regulatory floodway or coastal high hazard area".

There are two tabular representations in a FIS that depict key flood characteristics. The first is the Flood Profile, found in the back of the FIS text, which is a graphical representation of flood depths along a stream reach. The profiles can be thought of as a horizontal view of a section of stream taken along the middle of the channel. It is particularly useful for determining BFEs between cross-sections. A Flood Profile is shown in Figure 3-9.

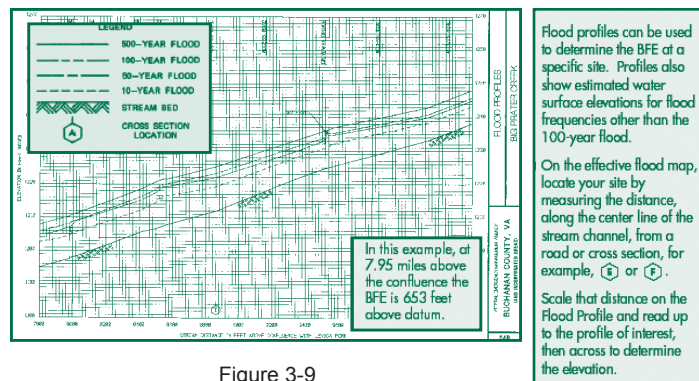


Figure 3-9

The second is when FEMA has designated floodways. The FIS will include Floodway Data Tables. The tables include the computed base flood elevation at each cross-section. They also include the water surface elevations predicted by the computer model when it "squeezed in" the flood fringe to simulate filling. A Floodway Data Table is shown in Figure 3-10.

FLOODING SOURCE	CROSS SECTION	DISTANCE	BASE FLOOD WATER-SURFACE ELEVATION (FEET NGVD)
ACCOLINK CREEK (continued)	AA	18,554 <sup>1</sup>	371.9
	AB	18,675 <sup>1</sup>	378.1
	AC	19,062 <sup>1</sup>	378.7
	AD	19,185 <sup>1</sup>	381.9
	AE	20,186 <sup>1</sup>	383.1
	AF	20,259 <sup>1</sup>	391.7
	AG	21,511 <sup>1</sup>	392.0
	AH	21,087 <sup>1</sup>	383.9
	AI	21,335 <sup>1</sup>	394.2
	AJ	21,421 <sup>1</sup>	397.2
	AK	21,630 <sup>1</sup>	397.4
DALE LESTINA TRIBUTARY	A	50 <sup>2</sup>	313.3
	B	169 <sup>2</sup>	317.2
	C	1,432 <sup>2</sup>	324.6
	D	3,243 <sup>2</sup>	338.3
	E	3,369 <sup>2</sup>	343.0

<sup>1</sup>Feet above corporate limits  
<sup>2</sup>Feet above confluence with North Fork Accotink Creek

TABLE 3	FEDERAL EMERGENCY MANAGEMENT AGENCY	STREAM STATION DATA
	CITY OF FAIRFAX, VA (INDEPENDENT CITY)	ACCOTINK CREEK - DALE LESTINA TRIBUTARY

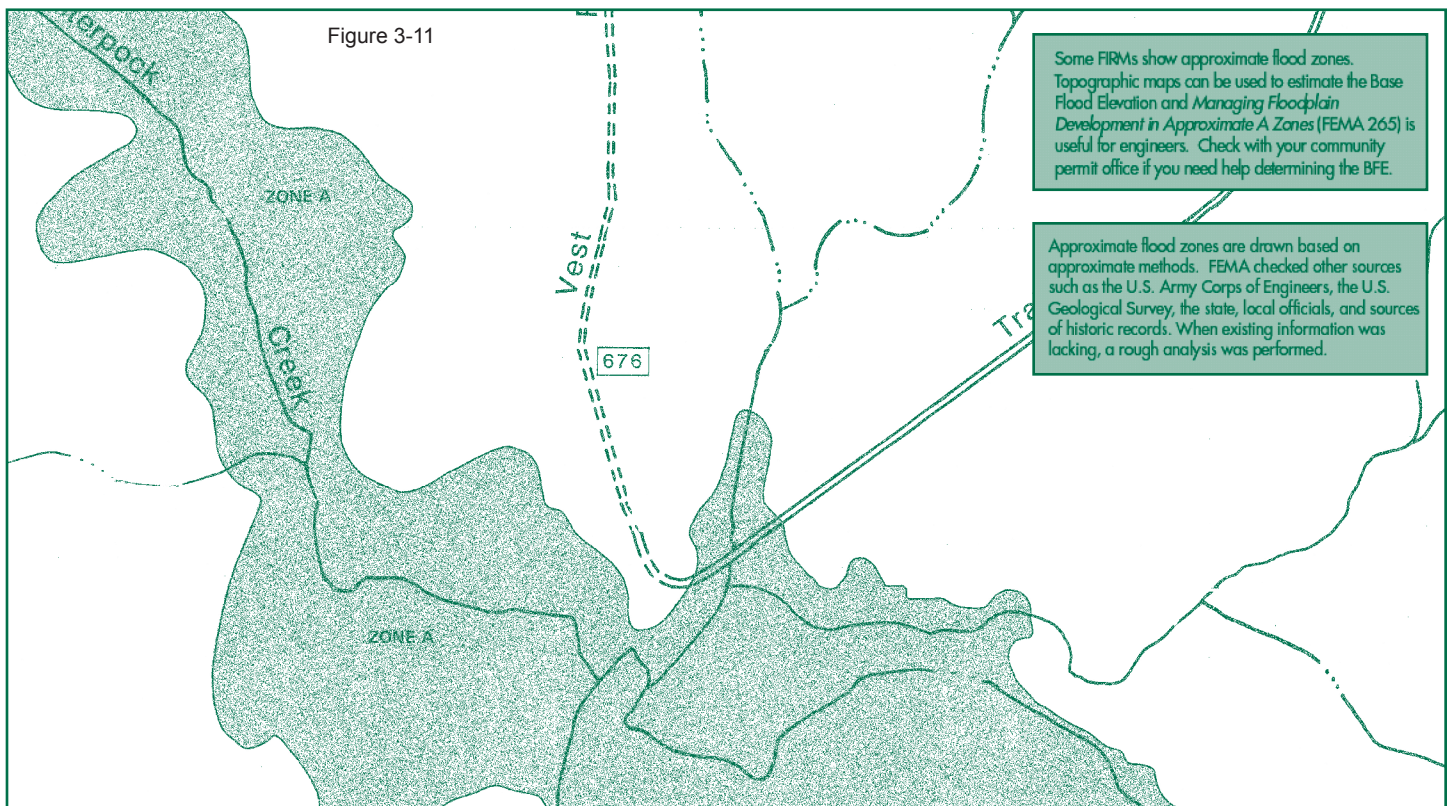
Figure 3-10

### 3.5 TYPES OF FLOODPLAIN DELINEATIONS AND MAPPING

The preferred format for the new and revised flood maps will be countywide digital Flood Insurance Rate Maps (DFIRMs) that meet FEMA's new DFIRM specifications as stated in the FEMA publication "Guidelines and Specifications for Flood Hazard Mapping Partners". These guidelines define the technical requirements, coordination, and product specifications for flood hazard maps and all associated products. Where feasible, FEMA will take advantage of economies of scale by performing flood studies over entire river basins, which can impact multiple counties and result in multiple countywide DFIRMs. The flood map upgrades will fall into three major categories. The first category is Detailed Studies which is for communities that either currently have inaccurate or outdated flood studies and maps, have approximate studies that need to be upgraded due to development pressures. The second category is Approximate Studies which

is for communities that are currently unmapped but flood-prone and for areas that are experiencing little or no development pressures. The third category is for upgrading current maps that have old topographic data or don't have digital mapping meeting FEMA's current DFIRM specifications. There will be two sub-categories for those communities that have flood maps that are currently mapped and do not need revisions; these are Mapping Redelineations and Digital Map Conversions.

When FEMA first began to look at your community's floodplain mapping needs, a meeting was held with community officials. The initial coordination meeting was to talk about known flooding problems and how much development was expected to occur in the future. FEMA used that information to make decisions about the level of detail and engineering to use in making the maps. Two levels of detail are used, detailed studies, and approximate studies.



**Detailed Studies.** In communities where there were homes and businesses that already experienced flooding, and also where new development in or near rivers and streams was expected, FEMA decided to prepare detailed studies. This meant that “detailed” engineering methods were used. A hydrologic analysis was prepared to determine how much water is expected to flow during the base flood. The analysis involves calculating the amount of runoff expected from the surrounding watershed. Many things influence hydrology, including soil types, type and amount of natural land cover, amount of pavement and roofs, and the slope of the land.

A hydraulic model uses the results of the hydrologic analysis to compute how high the water is expected to rise. The shape of the river or stream valley is an important part of this model, and so are other factors such as the slope of the channel and the amount and type of obstructions that may block or slow down the flow of water. Obstructions may be bridges, culverts, or dense riverbank vegetation.

The Floodway is determined by telling the computer model to “squeeze in” the floodplain as if it was being filled with dirt or a wall was built. The model does this until it predicts that the water level will increase by no more than one foot at any point along a length of waterway. When the one-foot rise occurs, that determines the boundary between the Floodway and the floodplain fringe. This is why the NFIP allows fill in the fringe without requiring an engineering analysis – it’s already been done by FEMA. The results of the hydraulic models are plotted on topographic maps to create the boundaries of the Floodway and the Special Flood Hazard Area.

### **Approximate Studies**

When FEMA determined that a community was unlikely to have existing flood problems, and especially if little or no new development was expected, then less-costly “approximate” methods were used to delineate the floodplain. Approximate boundaries of the SFHA

are delineated using soil information and mapping, historic high water marks, evidence of previous floods, or other appropriate sources. Detailed base flood elevations and Floodways are not defined.

When development is proposed in areas studied with approximate methods, communities and applicants may have to use the best available information to determine base flood elevations. Sometimes this means using topographic maps or simplified calculations. Sometimes you may need to have the applicant seek advice from an engineer to estimate the BFE.

### **Mapping Redelineations**

This remapping process may include redelineating floodplain boundaries on new topography and utilizing limited detail studies to replace areas that were previously studied using approximate study methods. It may involve establishing or revising base flood elevations through an engineering study or restudy utilizing existing data sources.

### **Digital Map Conversions**

Converting manually produced, paper maps to new DFIRM specifications; or upgrading existing digitally produced maps to the new DFIRM specifications. Utilizing current base map that meets current FEMA specifications.

When feasible, enhancing the flood theme by using all existing and readily available data that meet or exceed:

- NFIP mapping standards
- Incorporating LOMCs
- Fixing mismatched flood hazards across corporate limits

### 3.6 REVISIONS TO THE FLOOD INSURANCE RATE MAPS

The flood risk information that is shown on the maps and in the Flood Insurance Study forms the technical basis for your ordinance. FEMA uses the same information to set insurance rates. Care is exercised to ensure that the analytical methods are scientifically and technically correct, that the engineering procedures meet professional standards, and ultimately, that the results of the FIS are as accurate as possible.

Although rigorous technical standards are followed, FEMA recognizes that changes may be necessary. Some reasons for change include improvements in the techniques used to assess flood risks, changes in the physical condition of floodplains or watersheds, and the availability of new scientific or technical data. In addition, because many maps are printed at scales of one-inch to 500, 1,000 or 2,000 feet, there isn't enough detail to show every change in the ground. This means what look like "mistakes" may be found, that is, some individual properties may be shown as in the SFHA when they really are on high ground. But remember, the same "mistake" may mean that some properties are shown as out of the SFHA when they really are below the BFE.

FEMA can revise and amend maps and reports. Some revisions are made when FEMA receives requests from community officials, developers, and individual property owners. The technical data used for the study and maps must be used as the basis of a request that will change the boundaries of the flood hazard area, the boundaries of the floodway, or the base flood elevations. Data requests may be submitted through FEMA's web page, or by contacting FEMA Region III.

The defining factor between "approximate" and "detailed" is whether or not the BFEs have been characterized sufficiently to be published on the DFIRM. For example, an approximate or enhanced study will be one in which flood elevations, a flood profile, and a data table are available to local

officials but are not formally published. This gives local floodplain administrators additional floodplain information to assist in doing their jobs. A detailed study will be one in which flood elevations and a flood profile are published. This will require local floodplain administrators to adopt those elevations in their local floodplain management ordinances, thereby restricting them to the use of those elevations only.

In cases where new or updated topographic data exists, the flood elevation data would be remapped to the new topographic data source to improve the spatial quality of the mapped boundaries, as illustrated in figure 7-6. If, based on consultation with the community, the previous study for a flooding source is found to be inaccurate (for example, post-flood high-water marks reveal that the current FIS under- or over-predicts the flood hazards), the flooding source will be restudied, as budget is available.

#### A. UPDATES OF EFFECTIVE MAPS

To help applicants gather and complete the data necessary for map changes, FEMA has developed application and certification forms. Copies are available on FEMA's web site at [www.fema.gov/fhm](http://www.fema.gov/fhm). Additional detailed guidance on all the map change processes is found in FIA-12, Appeals, Revisions, and Amendments to NFIP Maps: A Guide for Community Officials.

Congress has directed FEMA to recover the cost of some types of map changes, and a fee schedule is published in the Code of Federal Regulations. If a map is found to be in error, for example when an Elevation Certificate shows that a building site is above (or below) the BFE, there is no fee for FEMA to prepare a Letter of Map Amendment (LOMA). However, when a developer proposes changing the floodplain by grading or filling, or if a new study is prepared to contest FEMA's information, then a fee is charged for processing a Letter of Map Revision (LOMR). If assistance is needed in determining what is necessary, either call the NFIP State Coordinator at

804-786-8073 or call the FEMA Map Support Center at 800-FEMAmapping

#### **i. Appeals**

FEMA's normal procedure for publishing new or revised maps includes a formal 90-day appeal period to allow for public review. A challenge to the proposed BFEs is called an "appeal." The changes that result from successful appeals are incorporated into the FIS report, FIRM, and/or floodway map before publication.

#### **ii. Protests**

A challenge received during the 90-day appeal period that does not address BFEs, but questions other flood risk information such as the floodway or floodplain boundaries, is termed a "protest." The changes that result from successful protests are incorporated into the reports and maps before publication.

#### **iii. Map Revision**

A change to an effective NFIP map is called a "map revision." The effective map is the most recent map. When a map revision is warranted, FEMA will revise and republish the affected map panels and, if necessary, the FIS report. This is referred to as a "physical map revision." If the scale of the revision is small, or if it affects only one property, FEMA will issue a letter, referred to as a "Letter of Map Revision" (LOMR). A LOMR describes the changes and officially revises the effective map.

#### **iv. Ordinance Revisions**

Once FEMA provides a community with the flood hazard information upon which floodplain management regulations are based, the community is required to adopt a floodplain management ordinance that meets or exceeds the minimum NFIP requirements. That also holds true for map revisions when FEMA republishes affected map panels. FEMA can suspend communities from the Program for failure to adopt once the community is notified of being flood-prone or for failure to maintain a floodplain management ordinance that meets or exceeds the minimum requirements of the NFIP.

### **B. LETTERS OF MAP CHANGE**

#### **i. Letter of Map Amendment**

A map amendment is how FEMA responds to a request to remove an individual structure and/or a legally described parcel of land from the SFHA. Because of the scale of the original topography, some parcels may have been inadvertently included in the SFHA. When FEMA determines that a parcel of land is actually above the BFE, a "Letter of Map Amendment" (LOMA) is issued. The LOMA applies to only the described structure or parcel, and officially amends the effective map.

#### **ii. Conditional Letter of Map Amendment**

When an applicant proposes to build on legally described parcels of land that are on natural ground or fill that was placed before the first NFIP map, FEMA may issue a conditional map amendment. If FEMA determines that a proposed structure would be out of the SFHA, a "Conditional Letter of Map Amendment" (CLOMA) is issued. A CLOMA does not officially amend the effective NFIP map.

#### **iii. Letter of Map Revision**

A change to an effective NFIP map is called a "map revision." The effective map is the most recent map. When a map revision is warranted, FEMA will revise and republish the affected map panels and, if necessary, the FIS report. This is referred to as a "physical map revision." If the scale of the revision is small, or if it affects only one property, FEMA will issue a letter, referred to as a "Letter of Map Revision" (LOMR). A LOMR describes the changes and officially revises the effective map.

#### **iv. Conditional Letter of Map Revision**

The NFIP regulations require that engineering analyses be performed for certain proposals that may alter the floodplain, such as flood control structures, waterway alterations, or fill for multiple lots. FEMA reviews the analyses to determine if the proposals are acceptable in terms of floodplain impact and if map revisions will

be required if projects go forward. FEMA's comments are known as "conditional determinations," and they are issued in "Conditional Letters of Map Revision" (CLOMR) and "Conditional Letters of Map Revision Based on Fill" (CLOMR-F).

# CHAPTER 4: FLOODPLAIN DEVELOPMENT STANDARDS AND COMPLIANCE ENFORCEMENT

## 4.1 NFIP MINIMUM STANDARDS

Throughout the United States there are approximately 22,000 communities that guide development to areas that are not subject to flood hazards. But when development in the SFHA does occur, there are ways to locate buildings on sites and to construct them to minimize the potential for damage. The NFIP minimum standards for new construction and substantial improvement of existing structures in SFHA are designed to achieve this goal.

To participate in the NFIP, the minimum development standards must be adopted by local jurisdictions that have land use authority. Federal regulations at Subpart B, Section 59.22(a)(3) require, as a condition for participation, that communities adopt the minimum provisions in Section 60.3. The standards must be applied to all development and structures built or substantially improved in the SFHA – they are covered in this chapter.

There are two very important definitions to be aware of when considering development in FEMA's special flood hazard area (a.k.a. 100-year floodplain) and meeting the minimum NFIP standards:

**Development** - Any man-made change to improved or unimproved real estate, including but not limited to buildings or other structures, mining, dredging, filling, grading, paving, excavation or drilling operations or storage of equipment or materials.

**Structure** - A walled and roofed building, including a gas or liquid storage tank that is principally above ground. Manufactured homes are structures. A three-sided shed is not a structure and isn't insurable under the NFIP, but a permit is required.

For further clarification of some of the nuances associated with complying with the NFIP's minimum standards, FEMA's NFIP Technical Bulletins have been provided in Appendix F. Here is a list of those bulletins:

- TB Guide-01 User's Guide to Technical Bulletins.
- TB 1-93 Openings in Foundation Walls for Buildings Located in Special Flood Hazard Areas.
- TB 2-93 Flood-Resistant Material Requirements for Buildings Located in Special Flood Hazard Areas.
- TB 3-93 Non-Residential Floodproofing – Requirements and Certification for Buildings Located in Special Flood Hazard Areas.
- TB 4-93 Elevator Installation for Buildings Located in Special Flood Hazard Areas.
- TB 5-93 Free of Obstruction Requirements for Buildings Located in Coastal High Hazard Areas.
- TB 6-93 Below Grade Parking Requirements for Buildings Located in Special Flood Hazard Areas.
- TB 7-93 Wet Floodproofing Requirements for Structures Located in Special Flood Hazard Areas.
- TB 8-06 Corrosion Protection for Metal Connectors in Coastal Areas for Structures Located in Special Flood Hazard Areas.
- TB 9-99 Design and Construction Guidance for Breakaway Walls Below Elevated Coastal Buildings.
- TB 10-01 Ensuring that Structures Built on Fill In or Near Special Flood Hazard Areas are Reasonably Safe From Flooding.
- TB 11-01 Crawlspace Construction for Buildings Located in Special Flood Hazard Areas.

## 4.2 CLASSIFICATIONS OF FLOODPLAIN DEVELOPMENT AND BUILDINGS

### A. POST-FIRM AND NEW CONSTRUCTION

The term new construction refers to buildings and structures that are built after the date of the community's first floodplain management ordinance. All new construction must comply with the ordinance and the NFIP minimum requirements. The term post-FIRM is used to refer to buildings that were constructed after the date of the first ordinance (or the date of the first Flood Insurance Rate Map) and substantial improvements that were made after that date.

For insurance purposes, post-FIRM buildings are charged actuarial rates, which are based on several factors related to actual risk. The most important factor is elevation of the lowest floor relative to the base flood elevation.

### B. PRE-FIRM AND EXISTING CONSTRUCTION

The term existing construction or existing structure refers to buildings and structures that existed before the effective date of the community's first FIRM. The term pre-FIRM refers to these older buildings. Many existing structures are non-conforming, which means they do not meet the minimum NFIP requirements. However, they are legal and grandfathered until and unless they undergo substantial improvement (including repair or restoration of substantial damage). Substantial improvement and substantial damage are described below.

For insurance purposes, the cost of NFIP flood insurance for pre-FIRM buildings is determined using rates that do not account for the full risk, but are cross-subsidized by other policies.

### C. RESIDENTIAL VERSUS NON-RESIDENTIAL BUILDINGS

Community ordinances outline some requirements that are different for residential and non-residential buildings. To properly apply the requirements, you need to distinguish between the two occupancies. The NFIP does not define the terms "residential" and "non-residential." However, the following definition of 'residential' is taken from ASCE 24, Flood Resistant Design and Construction, which then defines 'non-residential' as any uses that are not residential:

- Buildings and structures and portions of buildings and structures where people live, or that are used for sleeping purposes, including one- and two-family dwellings and multifamily dwellings;
- Buildings and structures or portions thereof that are used for residential purposes, including but not necessarily limited to boarding, lodging or rooming houses, hotels and motels, apartment buildings, convents and monasteries, dormitories, fraternity and sorority houses, vacation timeshare properties; and
- Residential board and care facilities that are occupied on a 24-hour basis, including assisted living facilities, halfway houses, group homes, congregate care facilities, social rehabilitation facilities, alcohol and drug centers, convalescent facilities, hospitals, nursing homes, mental hospitals, detoxification facilities, prisons, jails, reformatories, detention centers, correctional centers, prerelease centers, and other such uses.

New construction and substantial improvement of any residential structure is required to have the lowest floor, including the basement, elevated to or above base flood elevation.

New construction and substantial improvement of any commercial, industrial, or other non-residential structure must have the lowest floor, including the basement, elevated or flood-proofed to or above the base flood elevation. Where flood-proofing is used, a registered engineer or architect must certify that the design of the structure will provide protection from the base flood and that methods used are in accordance with accepted standards. This certification must be submitted with the permit application.

NFIP regulations allow nonresidential buildings like commercial structures and warehouses to be flood-proofed rather than elevated, to provide protection from the base flood. Flood-proofing consists of designing a structure in such a way that all parts of the structure located below the base-flood elevation are water-tight and/or resistant to flood damage. The two acceptable ways to flood-proof nonresidential buildings under the NFIP are dry and wet flood-proofing.

### **Dry Flood-proofing**

Dry floodproofing refers to the actual design of a structure that provides protection from the base flood. The structure must be designed to:

- prevent seepage, collapse, or cracking of basement walls;
- prevent water from backing up from sewer lines;
- include walls capable of withstanding hydrostatic pressure;
- locate all openings 1 foot above the base-flood elevation; and
- use waterproof seals and paints on exterior surfaces exposed to the base flood.

Another acceptable method of dry flood-proofing nonresidential structures under the NFIP is called human intervention. This involves the use of door and window shields as temporary protection from the base flood. This method should be used only where adequate flood warning time or devices are present. Extreme caution must be used in designing this flood-proofing measure. Generally, door and window shields are not effective for flood depths in excess of 3 feet, and may cause more damage to older structures than they prevent.

### **Wet Flood-proofing**

Wet flood-proofing allows floodwaters to enter enclosed areas of a structure. The benefit of wet flood-proofing is that if floodwaters are allowed to enter the enclosed areas of the structure and to quickly reach the same level of the floodwaters outside, the effects of hydrostatic pressure and buoyancy are greatly reduced. Therefore, the load imposed on the structure during a flood may be greatly reduced, thus eliminating structural damage.

Wet flood-proofing is generally used to limit damages to enclosures below elevated buildings, walkout-on-grade basements, below-grade basements, crawl spaces, or attached garages. Wet flood-proofing is not practical for areas that are to be used as living space.

#### **Successful wet flood-proofing includes:**

- ensuring that floodwaters enter and exit the structure;
- ensuring that floodwaters inside the building rise and fall at the same rate as floodwaters outside;
- protecting the areas of the structure that are below the flood level from damage caused by contact with floodwaters;
- protecting service equipment inside and outside the building; and
- relocating any material stored below the base-flood elevation.

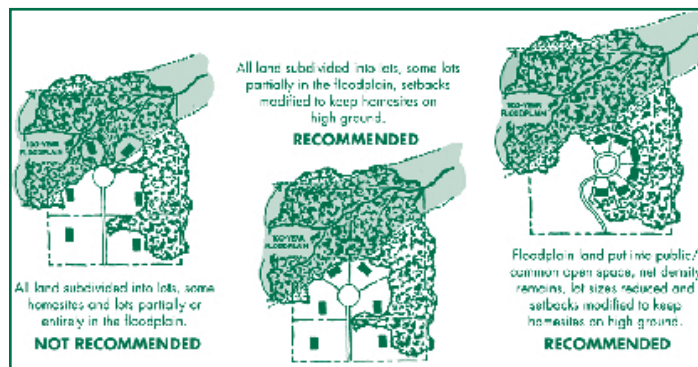
## 4.3 STANDARDS FOR LAND USE

### A. SUBDIVISIONS

New subdivisions must protect utilities and ensure adequate drainage. Base-flood elevation data are required for subdivisions and proposed developments that contain 50 lots or 5 acres or more. If FEMA has not established base-flood elevations for the proposed site, your community may need to generate the base-flood elevation data or require the applicant to provide the data. Remember the following guidelines for subdivisions:

- Locate and construct public utilities and facilities for electricity, gas, water, and sewer systems to minimize damage from floods.
- Locate electrical facilities above the base-flood elevation.
- Design gas, water, and sewer systems to withstand leakage or rupture during flooding.
- Plan and design building sites and streets to provide adequate drainage.

Subdivision applications should be carefully reviewed to ensure that floodplain impacts are avoided where possible, and if unavoidable, impacts must be minimized as much as possible. One way to do this is to put building pads on high ground and keep the SFHA as open space as shown in Figure 4-2 below. These days, many people think wooded streams are attractive and actually increase the value of the lots. Drainage improvements in subdivisions must also be designed and constructed to minimize flooding and diversion of water onto building sites.



An excellent reference for planning and designing subdivisions was published in 1997 by FEMA and the American Planning Association entitled Subdivision Design in Flood Hazard Areas, APA Planning Advisory Service Report Number 473.

### B. FLOODWAY ENCROACHMENTS

Regulating development in the floodway is important because of the possible depth and velocity of floodwaters, which can carry debris and cause erosion. The NFIP defines the floodway as the channel of a stream plus adjacent floodplain areas that must be reserved to discharge the base flood without cumulatively increasing the water surface. The NFIP limits such increases to 1 foot, provided that hazardous velocities are not produced.

If a community has a regulated floodway it must, at a minimum, prohibit encroachments, including fill, new construction, substantial improvements, and other development—unless a technical evaluation demonstrates that encroachments will not result in any increase in flood levels during a base-flood discharge.

If FEMA has determined the base-flood elevation but has not designated a floodway, a community must, on a case-by-case basis, require developers in the floodplain to determine by hydraulic analysis whether their project—when combined with existing and future developments—will cause more than a 1-foot increase in the base flood elevation.

Before issuing any building, grading or development permits for activities in the floodway, you should require this “no-rise” certificate. To be acceptable, the certification must demonstrate that the proposed development will not impact the BFEs, floodway elevations, or floodway widths.

In the extremely unusual and rare case that a community decides to permit a floodway proposal that could cause an increase the BFE, a Conditional Letter of Map Amendment (CLOMR) and floodway revision must be reviewed and issued by FEMA. The community should condition a preliminary approval on the applicant getting the CLOMR, and wait until after it is issued by FEMA before issuing the permit.

There are some land uses in floodways that can be allowed without extensive engineering analysis as long as they don't include filling and grading that changes the shape of the land. Those uses include:

- Agricultural uses not involving structures,
- At-grade uses such as parking and loading areas, airport landing strips,
- Passive recreational uses, such as hiking, biking, and horse trails, wildlife and nature preserves, and hunting and fishing areas,
- Active recreational uses (where improvements are anchored to prevent flotation), such as picnic and play grounds, ball fields, boat launching ramps, swimming areas, target shooting ranges, and golf courses and driving ranges without major grading, and
- Uses incidental to residential buildings, such as lawns, gardens, parking areas, play grounds and tot lots.

Activities that have to cross streams, such as bridges, roads, driveways, and utility crossings, can't avoid the floodway. But you can still require designs that minimize encroachment, which must be supported by an engineering analysis. Where floodways are fairly narrow, the best approach is to have bridges and culverts sized to span the entire floodway width.

Waste water treatment plants are almost always located in low areas to take advantage of gravity flow. Water supply plants that draw from surface water also tend to be located near rivers or lakes. When new facilities are planned, you should require consideration of alternatives avoid the floodway entirely. If they must be located in the floodway, an analysis of impacts must be prepared, and of course, the facilities must be flood-proofed to prevent damage, interruption of service, and health hazards during flooding.

Floodway boundaries are generally determined by applying the equal degree of encroachment rule. It requires that the quantity of floodwaters conveyed on both sides of the watercourse be reduced by an equal percentage, when developing the encroached floodway boundary. In practice, the rule is not always followed, because property owners are often not similarly situated.

Many factors may justify modifications to the rule, including topography, existing development patterns, and comprehensive land-use plans. However, deviations must be carefully considered, since floodways based on this rule most easily satisfy the legal requirement to treat similarly situated people in a similar manner. Some setback criteria may be an acceptable option.

### C. FILL IN THE FLOODPLAIN

The community's ordinance should include provisions that would only allow future floodplain development if it would not cause an increase in flood heights above a maximum allowable increase of 1 foot above the base-flood elevation. This provision should be administered based on a case-by-case evaluation of the effect of a proposed project and other anticipated floodplain development on flood flows. Excessive filling and developing of a floodplain without regard to effects on flood flows can result in greater flood velocities and increased flood heights.

### Approximate Floodplain

If fill is to be placed in a floodplain (SFHA) that is an un-numbered or approximate A Zone, then the provisions to maintain stream flow (covered in Section 60.3[b][7] of the NFIP regulations) must be followed. These requirements are specifically designed to protect structures or future development - not just the carrying capacity of streams and adjacent floodplains in rural areas. If the fill is for a development of more than 5 acres or 50 units (Section 60.3[b][3]), then a hydrologic and hydraulic study is required.

### Detailed Floodplain

If fill is to be placed in a SFHA that has a detailed study and BFEs, then a hydrologic and hydraulic study must be performed to assure that the “cumulative effect of the proposed development, when combined with all other existing and anticipated development, will not increase the water surface elevation of the base flood more than one foot at any point within the community” (Section 60.3[c][10]). A LOMR application will need to be submitted if the rise is more than one foot above the BFE or if a section of the watercourse is relocated.

### Floodplain With a Floodway

When a floodplain has a floodway, encroachment is permitted in the flood fringe (see Figure 3-9) without performing a study (since one has been performed already to show the affects of fill). However, if fill is allowed in the floodway, a hydrologic and hydraulic study is required to show that there is no rise in the BFE at any point in the floodplain resulting from the fill (Section 60.3[d][3]).

## 4.4 STANDARDS FOR FOUNDATIONS AND ENCLOSURES BELOW THE BFE

### A. FOUNDATIONS

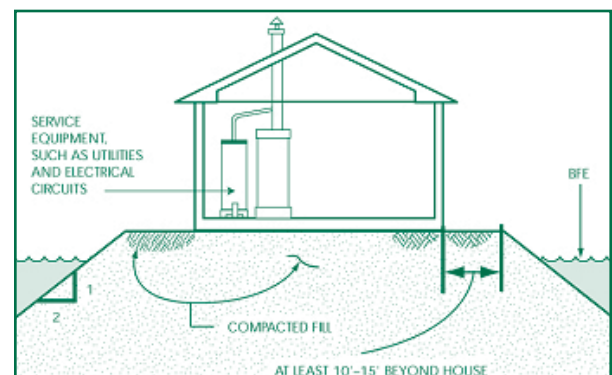
Foundations in A Zones do not have to be designed by a structural engineer to be acceptable under the NFIP. However, in some areas it is a good idea for you to require this added level of protection. High-risk areas include those floodplains where velocities are likely to be high, where debris impacts may increase danger, and where floodwaters are expected to be very deep and of prolonged duration.

Two standards, developed by the American Society of Civil Engineers, have design information that is especially useful for non-residential buildings and for structures in high-risk areas (including V Zones).

- ASCE 7, Minimum Design Loads for Buildings and Other Structures including flood load computation methodologies.
- ASCE 24, Flood Resistant Design and Construction, addresses design requirements for most development; this standard is referenced by the International Building Code.

### B. ELEVATING BUILDINGS

When buildings can't be located outside of the SFHA, they have to be elevated so that the lowest floor is at or above the BFE. The most common ways to elevate buildings are on fill, on solid foundation walls surrounding crawl spaces, or on posts, pilings, or columns.



### **Elevation on Fill**

Compacted fill can be placed to raise a building pad above the BFE. The best way to assure that fill is properly placed is to condition the permit so that the owner/developer is required to submit an “as-built” certification that the filled site is “reasonably protected from flooding.” Appendix F includes Technical Bulletin TB 10-01 Ensuring that Structures Built on Fill In or Near Special Flood Hazard Areas are Reasonably Safe From Flooding, which includes a sample certification form.

Good fill material must be used, and the fill must be compacted to reduce the chances that floodwaters will cause saturated soils to slump and fail when water recedes. Graded side slopes typically should be no steeper than 2:1 (two feet of horizontal for every one foot of vertical height), and planted with tightly growing vegetation. Compacted fill should extend 10-15 feet around the building.

Sometimes an applicant proposes placing floodplain fill in order to excavate a basement into it at a later date. A basement is any area, regardless of how it is used, that is below grade on all sides. The NFIP standards do not allow basements below the BFE and you should not approve permits for basements in fill. Even when excavated into fill, basements may be subject to damage, especially in floodplains where waters remain high for more than a few days. Damage may also occur when fill materials become saturated and inadequately support the building or water pressure collapses basement walls.

Sometimes people want to obtain from FEMA a Letter of Map Amendment based on Fill (LOMA-F) in order to remove the flood insurance requirement. The LOMA-F is the only way to officially remove a property filled site from the mapped flood hazard areas. To qualify, the fill must be adequately compacted and otherwise determined to provide adequate protection so that the building on the fill can be certified a “reasonably protected from flooding” (see TB 10-1 in Appendix F).

The “as-built” certification is required by FEMA as part of supporting documentation for a LOMA-F.

### **Elevation on Solid Foundation Walls**

Solid foundation/perimeter walls may be made of poured concrete, pre-fabricated concrete slabs, or reinforced or unreinforced masonry block or brick construction. Solid foundation walls extend around all sides of the building. The foundation walls must have flood openings

### **Elevation on Posts, Columns, Piers or Pilings**

Posts or columns are usually wood, steel, or prefabricated concrete/masonry supports that are placed on footers in pre-dug holes and backfilled with compacted material. Piers are usually constructed in-place of reinforced masonry block or brick. Pilings are usually long and slender in shape and are driven or jetted into the ground by mechanical means. They often appear similar to telephone poles or may be small-diameter concrete poles or steel members, and are used primarily in coastal areas where soils are sandy.

## **C. BASEMENTS**

Basements are very susceptible to flood damage. Unequal hydrostatic pressure often collapses basement walls, and even water that is shallow around the building can quickly fill up a basement. Also contributing to damage is the fact that many people pump out flooded basements too fast, which also results in collapsed walls because the saturated ground presses inward.

The NFIP defines a basement as any area that is below grade on all sides. It doesn't matter what you call the area – if it is below the ground level on all sides, then it is a basement. It also doesn't matter if the floor level is only inches below the ground, technically it is a “basement”. You need to pay extra attention to crawl spaces. If the ground surface inside the foundation walls is below the outside ground level, then the crawl space is considered a basement.

Especially in hilly areas, buildings may have “walk-out” basements, where at least one side is at or above grade. But remember, a walk-out basement is an enclosure below BFE, and your ordinance requires that it have adequate flood opening, be constructed with flood-resistant materials, and have its use limited to parking, storage, and building access. Otherwise, not only is the area likely to sustain more flood damage, but for insurance purposes it is a basement and the cost of coverage will be very high.

#### D. ENCLOSURES BELOW BFE

Areas below BFE may be enclosed provided they are constructed and used as allowed by the NFIP. If they do not meet the design and use standards, then the enclosure’s floor becomes the lowest floor for insurance purposes. This can mean very high insurance rates (see graphic in Section 4.3 to see how insurance costs are affected by the lowest floor elevation).

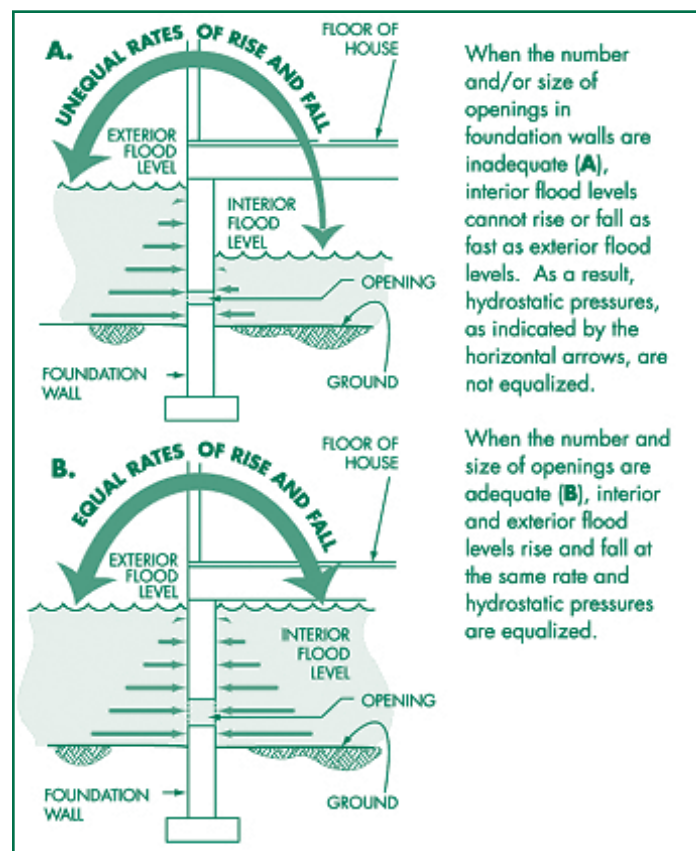
The NFIP allows enclosed areas below BFE as long as they are used only for limited storage, parking of vehicles, and access to the building. Any other use is a violation of the ordinance – this means even a small bathroom, workshop, utility room, or extra bedroom are not allowed.

Before applicants consider building enclosures below BFE, they need to understand the kind of damage that may occur. Ideally, they need to take into consideration velocities, impacts by floating debris, impacts by ice, and the length of time floodwaters may be up against buildings.

For waterways studied using detailed methods, average flow velocities can be found in the Flood Insurance Study, and depth is computed by knowing the ground elevation and the BFE. In unnumbered A Zones, judgement is required to estimate velocity, while depth is determined using approximate methods.

Enclosures must be designed and constructed by using flood-resistant materials and using specific techniques to minimize damage due to both hydrostatic and hydrodynamic forces. Hydrostatic forces are due to water rising unequally on one side of a wall. Hydrodynamic forces are caused by the forces of moving water and the impact of debris.

Flood openings, also referred to as flood vents, allow water to freely flow in and out of an enclosure below the BFE. Because water flows freely, unequal hydrostatic forces don’t develop and walls are less likely to be damaged or collapse. See Section 6.25 for specific requirements for flood openings.



It is more difficult to build enclosures below BFE so that they don't get damaged by fast moving water. Areas where debris may slam into buildings also need special attention. The NFIP doesn't outline specific ways to build in these areas. There is no simple rule, but when velocities exceed 3-5 feet per second it would be reasonable to require design by a registered architect or engineer. If you have an area where debris is a problem, require the applicant to research debris impact loads outlined in ASCE 7, Minimum Design Loads for Buildings and Other Structures.

### Basements Prohibited

Enclosed areas may not be subgrade (below ground level) on all four sides. Technically, this would create a basement, even if it is subgrade by only a couple of inches.

### Water Resistant Materials

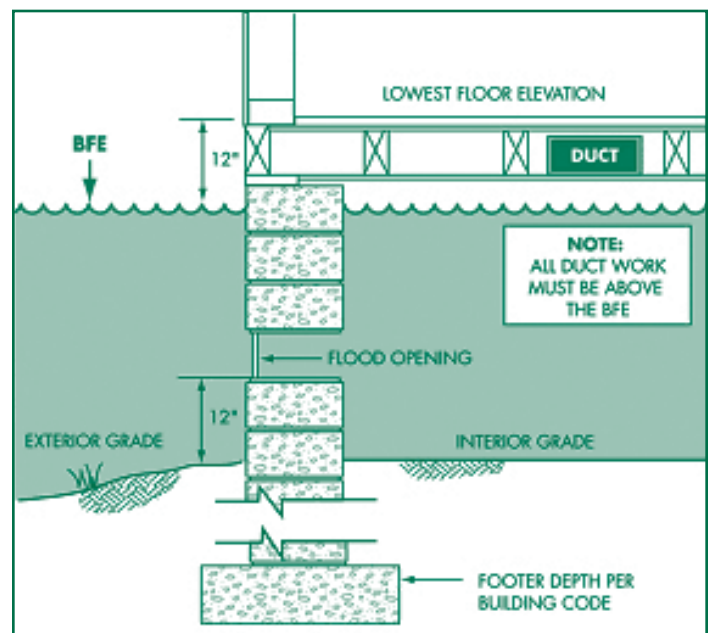
All interior wall, floor, and ceiling materials located below the BFE must be resistant to water damage. It is best to leave these areas unfinished in order to discourage uses that are not consistent with the NFIP restrictions.

### Flood Openings/Vents

At least two flood openings, also called water equalizing vents, must be installed on different walls of any enclosed area below BFE. The bottoms of the openings may be no more than one foot above ground level. Importantly, the net effective flow area is very important, as is the requirement that flood openings allow for the automatic inflow of rising floodwaters and outflow of receding floodwaters. Garage doors, by themselves, do not satisfy the flood opening requirement.

FEMA's Technical Bulletin 1-93 Openings in Foundation Walls is an important resource (Appendix F). There are two ways to satisfy the net opening requirements:

- **Prescriptive openings.** The total net effective area of all openings must add up to one square inch for each square foot of enclosed area below the BFE. It is common for builders to install a typical foundation air vent – this is acceptable provided the net open area is measured. The obstruction presented by any cover, frame, grille, stiles, or louvers (but not insect screen) must be accounted for – you cannot use 128 square inches simply because a standard air vent can be installed in an opening that measures 8" x 16". If the air vent is rated for air flow, you may use the net open area that is assigned for that rating. To satisfy the automatic inflow and outflow requirements, closure devices (slides, levers, etc.) must be disabled in the open position.
- **Certified flood openings.** Flood openings that are specifically designed to meet the performance requirements set forth in the Technical Bulletin are acceptable, provided the openings are certified by a registered professional engineer or architect. You should keep a copy of the certification in your permanent permit file, and the owner should keep a copy so that insurance agents know how to rate the building.



## E. USE OF AREAS BELOW BFE

### Restrictions on Use

Use of enclosed areas must be strictly limited to parking of vehicles, limited storage, and/or access to the building. Crawl spaces are allowed “enclosed” uses, as are temporary structures.

### Utilities and Equipment

Electrical or mechanical equipment may not be located below the BFE. This includes but is not limited to: plumbing, mechanical, heating/cooling, and electrical service and equipment. Enclosures below BFE should not be designed for appliances because appliances are not compatible with the allowable uses. If appliances must be located in crawl spaces or garages, they must be elevated on permanent platforms or the enclosed area becomes the lowest floor for insurance purposes.

### Garage/Parking

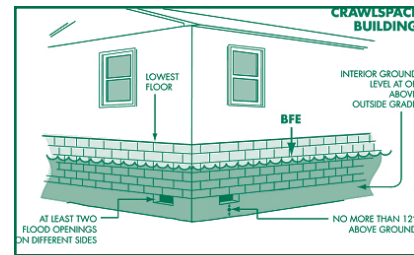
An attached garage can be below BFE as long as it meets the criteria for allowable enclosures. Remember that electrical service, even for tool benches, must be elevated or hung from the ceiling. Also, appliances installed in the garage must be elevated on platforms to be at or above BFE. Detached garages should be issued a separate permit, but they may be at-grade as long as they meet the criteria for enclosures below BFE. Under-story parking areas, such as may be provided in large nonresidential buildings, may be permitted as long as they meet the same criteria.

### Limited Storage

The NFIP does not specify what can be stored in areas below BFE, although it makes sense that the floodplain is a bad place to store hazardous chemicals. The idea behind limited storage is to try to minimize the amount of damage. Because enclosures below BFE are designed to flood, everything stored in them will, at some time, be damaged. To help meet the intent of limited storage, a local ordinance can require that enclosures, including accessory structures, are limited in size.

### Building Access

Getting into buildings that are not elevated on fill may appear to be a problem, especially if they’re more than four or five feet above the ground. If exterior steps are not provided, the NFIP allows enclosure of small areas for entrance foyers and stairwells. These enclosures, which are common along coastal areas, must have flood openings and must be constructed with water resistant materials.



### Crawl Space

Crawl spaces are common in areas where groundwater is high or the soils remain saturated in the Spring. The typical crawl space is about 3 feet high, just enough room to allow workmen to get to utilities that are run between the joists under the floor. However, in SFHAs, elevating buildings on crawl spaces is a good method – just make sure the floor is high enough to keep the utility lines and insulation above the BFE. Some owners use crawl spaces for storage of yard and garden equipment.

### Storage of Equipment and Dangerous Materials

Anything stored below the BFE will be damaged when the water rises. Where practical, such items should be anchored or moved to safer areas if there is sufficient warning time. This is especially important for high-cost equipment.

Hazardous, flammable, or explosive materials and chemicals, such as pool cleaning chemicals, agricultural chemicals, paint removers, fuels, and similar materials should not be stored below the BFE. Some chemicals are highly reactive when they come in contact with water. Others could cause health hazards if they are washed downstream.

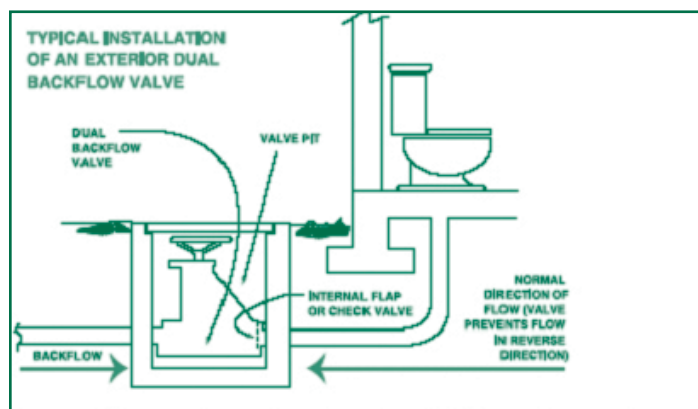
## 4.5 STANDARDS FOR PROTECTIVE MEASURES OF BUILDING AND INFRASTRUCTURE COMPONENTS

### A. PROTECTING UTILITIES

Because of high replacement costs and potential health risks, the NFIP requires that all utility service lines be located and constructed to minimize or eliminate flood damage. Utilities include sewage, gas, electrical, HVAC, and water systems.

#### Public Utilities

In riverine floodplains, most flood damage to public utility lines occurs where they cross under waterways, or if they are parallel to waterways but too close to eroding stream banks. A good rule of thumb for most waterways is to require the top of utility crossings, including casements, to be at least 3' beneath the lowest part of the streambed. In areas with very erodible soils, it is safer to be even deeper. Utility lines that follow waterways should be at least 25' back from the top of bank (even further in areas with highly erodible soils). Stream bank protection such as riprap or gabion (rock filled wire baskets) may be required if velocities are expected to be erosive.



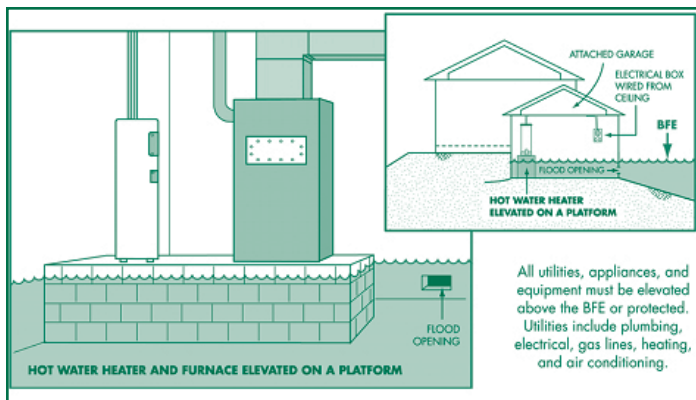
It is important to make design decisions that will minimize or eliminate infiltration of floodwaters in new and replacement water supply systems, sanitary sewer systems, and on-site waste disposal systems. In designing sewage systems, take the following steps to avoid causing contamination during flooding:

- Place manhole covers above the base-flood elevation, or design them to minimize flood damage.
- Flood-proof such waste disposal facilities as pumping stations, lagoons, and treatment plants. You may need to build dikes with adequate armor on the stream side to protect waste treatment facilities located below the base-flood elevation.
- Situate and construct on-site waste disposal and treatment systems like septic tanks to avoid problems during flooding. This may be difficult, because on-site facilities may be substantially below the first-floor level. Generally, inlets to or outlets from the septic tank should be equipped with check valves to prevent floodwaters from returning through the pipes. A mound system, which is an above-ground filter system for waste disposal, may be used instead of a drainage bed to provide adequate drainage during flooding.

#### Building Utilities

All plumbing, mechanical, and heating and air conditioning components must be elevated to or above the BFE, including toilets, sinks, showers, water heaters, furnaces, heat pumps, air conditioners, air distribution systems, generators, and other permanent plumbing, mechanical, and electrical installations. Only under unusual circumstances can these components be sealed against the infiltration of water.

Backflow into homes from sewer lines can be caused by rising flood water. Not only does this cause water damage, but the contamination poses a serious health threat. The easiest way to minimize this damage is to require installation of backflow valves. Each home can have its own backflow valve, or a larger system can be installed to serve several homes in a subdivision. Obviously, water inside the building cannot be used until after the flood recedes.



Appliances and machinery can be located in enclosures below BFE, but only if they are elevated on platforms or if a watertight enclosure is built around them. Remember, heat pumps outside of the building must be elevated above the BFE. This is most easily done by building a platform, although sometimes a small deck is cantilevered off of the building.

Vents and heating/air conditioning duct work are often installed incorrectly in buildings in the SFHA. The most common reason is because the minimum elevation requirement for buildings calls for the walking surface of the lowest floor to be at the BFE. Since duct work usually is installed between the joists under the floor, it can end up being below BFE. Even when floodwaters just touch the duct insulation, costly damage results. If you see duct work below the BFE, it is a violation of your ordinance.

Electrical equipment, switches, and outlets on the building side of the meter must be elevated. Since a specialty contractor usually handles the electrical work, be sure the plans show the required elevation. You may allow one light switch below the BFE, in which case you should check that the plans call for materials designed for wet locations.

## Electric Meters

Electric companies control the placement of electrical meters, which are outside of the building. This means meters may not be fully elevated, which could hamper restoration of service. A good thing to do is to contact the companies that serve your community and ask them to consider installing meters and transformers at least one-foot above the BFE.

## Elevators

Elevators may be installed in elevated buildings, and clearly they must be accessible from ground level. Appendix F includes FEMA's Technical Bulletin 4-93 Elevator Installation.

## B. FLOOD-RESISTANT MATERIALS BELOW BFE

Flood-resistant material is defined as any building material capable of withstanding direct and prolonged contact with floodwaters without sustaining significant damage. In this definition:

- Prolonged contact means at least 72 hours.
- Significant damage means any damage requiring more than low-cost, cosmetic repair.

All building materials below the BFE must be resistant to water damage. Even in areas where floods rise and fall rapidly, wood and finishing materials may be damaged enough to require replacement.

The NFIP regulations do not define or list materials that are flood-resistant. The best source of information is FEMA's Technical Bulletin 2-93 Flood-Resistant Materials Requirements for Buildings Located in Special Flood Hazard Areas (Appendix F). Materials necessary to meet applicable fire safety building codes are allowed, even if they're not considered to be water resistant.

### C. ANCHORING STORAGE TANKS

Above-ground tanks may be elevated on platforms above the BFE or installed at-grade, provided they are anchored. Underground tanks must be anchored. And in both cases, fill openings or vents must be elevated above the BFE to minimize water entry and to minimize loss of contents during flooding.

Anchoring is required to prevent hydrodynamic and buoyant forces from moving structures off foundations or off-site. To design an anchoring system for above-ground tanks, an engineer needs to know the anticipated velocity and depth of flood water. Depth is needed because the pressure of the water is a function of depth. Velocity is needed because the force that tries to wash things away increases as the flow velocity increases. Anchoring must be designed assuming a tank is empty, which is when it will have the greatest tendency to float. Empty or partially full tanks are subject to significant forces when floodwaters rise. They can exert tremendous forces and may pull what appear to be good anchors out of the ground. Floating tanks become projectiles that damage other buildings, or may be damaged and explode.

#### Above-Ground Tanks

Above-ground tanks must be elevated above BFE and/or anchored. Elevation is the safest way to go, because even a solidly anchored tank can be damaged or punctured by floating debris. Damaged tanks may leak, causing contamination. More significantly, tanks that hold flammable or explosive materials may explode and cause a lot more damage to surrounding buildings.

#### Underground Tanks

Underground tanks can also cause problems, especially in areas where flooding lasts more than one or two days. When the ground gets saturated, tanks can actually become so buoyant they “float” out of the ground. What this means is that you need to require engineered installation for underground tanks, especially those that contain fuels which will pollute the water or create a fire hazard.



**NOTE:**  
FPA 58, Liquefied Petroleum Gas Code, allows domestic, residential and commercial tanks of less than 20 gallons to be elevated a maximum of 5-feet above the ground.

## 4.6 STANDARDS FOR SPECIALIZED STRUCTURES

### A. ACCESSORY BUILDINGS

Accessory structures are development and must be handled by issuance of a flood development permit even if a building permit is not required by your community.

An accessory structure is a separate building on the same parcel of land as a principal building, and its use is incidental to the use of the principal building. Accessory structures include detached garages and tool and garden sheds. They need not be fully elevated as long as they are handled in accordance with the design requirements that include anchoring, elevated utilities and equipment, flood-resistant materials, and flood openings. A good reference is Technical Bulletin 7-93 Wet Floodproofing Requirements (Appendix F).

Because accessory structures are enclosed areas below BFE, only two acceptable uses are permitted – parking of vehicles and limited storage. An accessory structure may not be used for business purposes. If a community wishes to allow a non-elevated/non-dry flood-proofed accessory structures, the community must establish the meaning of low-cost and small accessory structures. Communities may allow wet flood-proofing of these structures provided that they represent a minimal investment and are designed to have a low damage potential with respect to the structure and contents. Accessory structures must be anchored to prevent flotation. Over the top ties to ground anchors or bolts embedded in a concrete pad will work. To minimize damage due to hydrostatic pressure, even small sheds must have flood openings.

The following requirements, at a minimum, must be attached to the variance for an accessory structure:

- 1) it must be anchored to resist flotation, collapse, and lateral movement;
- 2) the portions of these structures located below the BFE must be constructed of flood-resistant materials;
- 3) it must be designed to allow for the automatic entry of flood waters;
- 4) mechanical and utility equipment must be elevated or flood-proofed to or above the BFE;
- 5) it must comply with the floodway encroachment provisions of the NFIP Regulations; and
- 6) its use must be limited to parking and/or limited storage.

Note that a flood insurance policy for the principal building does not cover an accessory structure. If insurance is desired, a separate policy will need to be purchased.

## B. MANUFACTURED HOMES

The current regulation requires that new manufactured-home installations have the lowest floor elevated to or above the base-flood elevation, but it does not specify the technique to be used.

If your community has existing manufactured home parks or subdivisions (as defined in NFIP Regulations, Section 59.1), there is an additional option. On sites in existing manufactured home parks or subdivisions that have not previously suffered substantial damage from a flood, the elevation requirement is either the lowest floor at or above base-flood elevation, or placing the chassis 36 inches above grade.

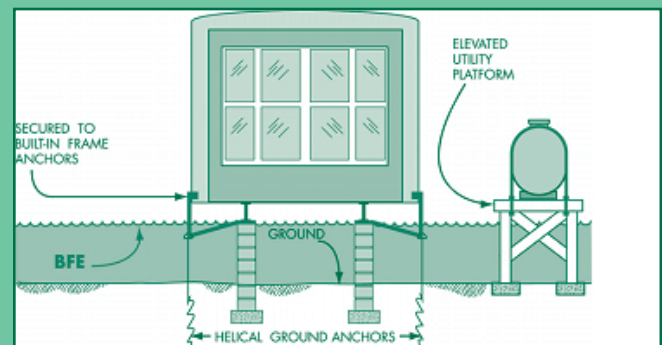
Manufactured housing is the fastest growing housing type in the nation because it is more affordable than conventional construction. But manufactured homes are much more vulnerable to flood damage. Because of this potential for damage, some communities strongly discourage placement in SFHAs, even prohibiting them in floodways and V Zones.

Manufactured homes in floodways are extremely vulnerable and should not be allowed. You are encouraged to work with owners to find safer sites outside of the SFHA, or at least to place them where the flood hazard is reduced. You should check the Floodway Data Table in the FIS report to find an estimate of the velocity of floodwaters. Because flowing water puts greater loads on foundations, you may want to require an engineered foundation to ensure structural stability. Where placement is unavoidable, units should be installed so that they are parallel to the direction of flow to minimize obstruction of floodwaters.

The anchoring, tie-down, and permanent foundation requirements for manufactured homes must be clearly outlined in the permit. Do not rely on MFH installers to know how to place units in flood-prone areas. The method of elevation and anchoring should be described, including the materials that are approved for use. Remember, if the unit is placed on a solid perimeter foundation, flood openings must be installed. Even standard skirting will be damaged under flood conditions.

### NOTE:

Existing manufactured home park or subdivision means an MFH park or subdivision for which the construction of facilities for servicing the lots (including, at a minimum, the installation of utilities, the construction of streets, and either final site grading or the pouring of concrete pads) is completed before the effective date of the first floodplain ordinance.



**Figure 4-9. Manufactured Homes must be elevated and anchored properly.**

## MFH Foundation Requirements

A permanent foundation under a manufactured home includes all of the following features:

- A below-grade footing capable of providing resistance against overturning.
- The footing depth has to be below the frost line.
- Permanent foundation systems include reinforced piers, driven pilings, embedded posts, and poured concrete or reinforced block foundation walls.
- Dry stacked concrete block is not acceptable.
- An anchoring system capable of resisting uplift and overturning due to flood and wind forces, and able to maintain the required pullout resistance in saturated soil conditions. A complete anchoring system includes a combination of ties, anchors, and anchoring equipment.
- Connections between the foundation and the manufactured unit so that it acts as a cohesive unit when resisting flood and wind forces. The size, strength, and configuration of the connections, such as straps and anchor bolts, should be selected to resist forces anticipated under base flood conditions. The NFIP requires over-the-top or frame ties to ground anchors to connect the permanent foundation.

FEMA-85, *Manufactured Home Installation in Flood Hazard Areas* is a good resource to utilize for guidance on a wide variety of conditions involving installation of manufactured homes in floodplains.

## C. AGRICULTURAL BUILDINGS

There are two options for allowing agricultural structures in SFHAs. They may be elevated just like other structures, or they may be allowed below BFE (wet flood-proofed) under certain conditions, but only by the granting of a variance. Each community should carefully consider whether it wants to allow – or prohibit – new and replacement agricultural structures. When someone wants to build a new structure, it may seem like a good idea. But remember all the damage suffered by farmers during past floods. Call the State NFIP Coordinator for assistance if you decide to handle them by variance.

Including specific variance provisions in your ordinance does not give your community freedom to permit any and all agricultural structures, nor can you waive all the

other NFIP requirements when a variance is granted. Each proposal must be reviewed, and if appropriate, an individual variance hearing must be conducted. These variances must be handled in the same manner outlined in Chapter 2, including notification of the increased risk and increases in flood insurance premium costs.

FEMA has outlined seven conditions that must be met when reviewing and granting variances for wet flood-proofed agricultural structures. These conditions, summarized below, help to avoid significant damage during the base flood:

- Use of the structure is limited to agricultural purposes,
- Use of flood-resistant materials below the BFE is mandatory,
- The structure must be anchored to resist flotation, collapse, or lateral movement; all structure components must be resistant to flood-related forces, including debris impact,
- The hydrostatic venting (flood opening) requirement applies,
- Mechanical, electrical, or other utility equipment must be elevated or flood-proofed,
- The floodway encroachment provisions cannot be waived, and
- Major equipment, machinery, or other contents must be protected through relocation or removal to a site out of the SFHA prior to a flood.

Because granting variances for wet flood-proofed agricultural structures is a serious matter, FEMA recommends careful consideration of the following:

- Is the proposed site in a wide, expansive floodplain area where there is no other reasonable location, for example is the entire farm acreage in the SFHA?
- Is it possible to impose a size limit, and perhaps a maximum number of wet flood-proofed structures on a single farm, in order to limit financial losses?
- Check carefully to see if the proposed building is near an uncertified levee – levee failure can cause very high velocity waters.
- Remember to look at combinations of elevation and wet flood-proofing so that the variance is, indeed, the minimum necessary.

## D. TEMPORARY STRUCTURES

The NFIP regulations do not specifically address temporary structures in flood-prone areas. FEMA Region IV suggests that certain conditions be imposed when permitting temporary structures. At a minimum, they must be anchored to resist flotation so that they do not float downstream and cause damage to other buildings or bridges.

The most common temporary structures are construction trailers, portable bathroom facilities, and large trash receptacles. Sometimes applicants want to place small structures for such uses as roadside stands or information kiosks. You should get additional guidance from the State NFIP Coordinator when you get an unusual request.

The following should be considered:

- Is use of the temporary structure unique to the land being developed? Can the structure be placed outside of the SFHA? Can the structure meet NFIP design standards?
- Will denial of a special use permit create an undue hardship on the property owner?
- Do you have sufficient staff to monitor the placement, use, and removal of the temporary structure throughout the duration of the permit?

## E. RECREATIONAL VEHICLES

Recreational vehicles are specifically defined by your flood damage prevention ordinance. If they meet all of the following criteria, then individual RV units may be placed in the SFHA without elevation:

- On site for fewer than 180 consecutive days,
- Built on a single chassis and is on its wheels or jacking system,
- Attached to a site only by quick-disconnect utility service and security devices,
- 400 square feet or less when measured at the largest horizontal projection and has no permanently attached additions,
- Fully licensed and ready for highway use as a self-propelled vehicle, or permanently towable by a light duty truck, and

- Designed primarily not for use as a permanent dwelling, but as temporary living quarters for recreational, camping, travel, or seasonal use.

Proposals for new RV parks need to be reviewed to make sure water and sewer services meet the requirements to prevent inflow and outflow during flood conditions. There are no special rules for buildings in RV parks, such as offices, convenience stores, shower and laundry buildings, maintenance facilities, and other structures. They must be elevated and meet all the criteria for buildings in SFHAs.

## F. FUNCTIONALLY DEPENDENT USE BUILDINGS

Functionally dependent use means a use that cannot perform its intended purpose unless it is located or carried out in close proximity to water. It includes only docking facilities, port facilities that are necessary for the loading and unloading of cargo or passengers, and ship building and ship repair facilities, but does not include long-term storage or related manufacturing facilities.

Construction of a new functionally dependent use, or the substantial improvement of an existing functionally dependent use, may be approved only by variance. When a building is determined to meet the definition, it need not be designed and constructed in full conformance with the NFIP minimum requirements. In addition, as part of the variance consideration, you need to review the proposal to make sure it doesn't create additional threats to public safety.

The functionally dependent designation does not relieve the applicant or the community of the responsibility to incorporate measures to reduce the potential for damage to the extent practicable. The best way to do this is to treat the building as an enclosure below the BFE.

## 4.7 ADDITIONAL HAZARD PROTECTION STANDARDS FOR COASTAL DEVELOPMENT

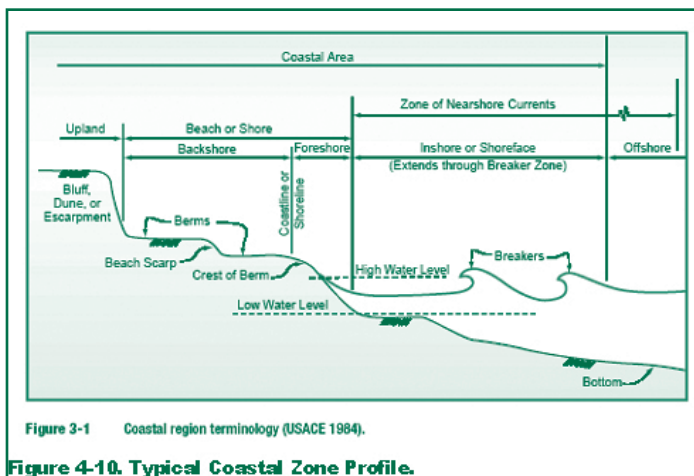
If a community is adjacent to the ocean, it may be subject to the following kinds of problems: higher-than normal tides because of barometric pressure differentials, storm surges, and wind-driven waves; erosion that undermines building foundations; and battering by storm-driven debris.

These areas are designated as V Zones on the FIRM. They are defined as those portions of the coastal base floodplain that would be inundated by tidal surges with velocity wave action. Generally, a V Zone indicates the inland extent of a 3-foot breaking wave, where the wave run-up during the base flood decreases to less than 3 feet.

Because of the special hazards associated within locating in a V Zone, the NFIP requires additional floodplain management measures.

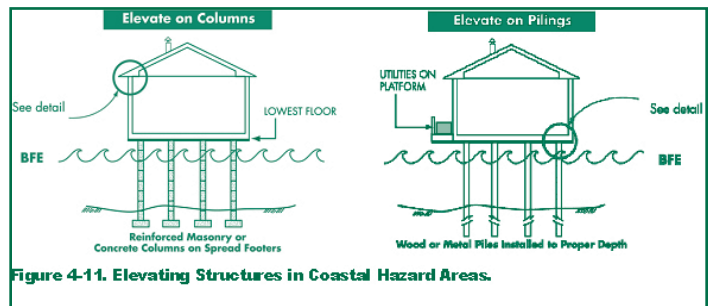
### A. NEW CONSTRUCTION LOCATED LANDWARD OF MEAN HIGH TIDE

The NFIP regulations require that all new construction in V Zones must be located landward of the reach of mean high tide.



### B. ELEVATING STRUCTURES ABOVE THE BFE

In coastal high hazard areas, new and substantially improved buildings have to be elevated so that the bottom of the lowest horizontal structural member (excluding pilings and columns) is at or above the BFE. The most common way to elevate residential buildings is on pilings or columns.



A certificate of the design of foundations for buildings in V Zones is required to be submitted prior to issuance of a permit. A registered professional engineer or architect shall develop or review the structural design, specifications and plans for construction and shall certify that the design and methods of construction are in accordance with accepted standards of practice. Further, certification is required to assure that the foundation and structure attached to it is anchored to resist flotation, collapse, and lateral movement due to the effects of wind and water loads acting simultaneously on all building components. Water loading values are associated with the base flood; wind loading values shall be those required by State or local codes and standards.

Non-residential buildings, especially larger structures, are often supported on parallel shear wall foundations. This method is especially applicable when parking is proposed for the area under the elevated building. The Structural walls must be oriented parallel to the expected flow of water, which often – but not always – is at right angles to the shoreline. Check with long-term residents to find out if there is a prevailing direction from which flooding waves arrive. Parallel shear walls

are one-dimensional, they do not enclose an area and they do not “turn corners.”

#### Connecting the Load Path

To meet the requirements outlined above, the building must be connected, from roof to walls to foundation by what is referred to as a “continuous load path”. Air-borne salts in coastal environments can jeopardize connections due to corrosion. Builders should use materials that resist deterioration over time. Appendix F includes FEMA’s Technical Bulletin 8-96 Corrosion Protection for Metal Connectors in Coastal Areas for Structures Located in Special Flood Hazard Areas.

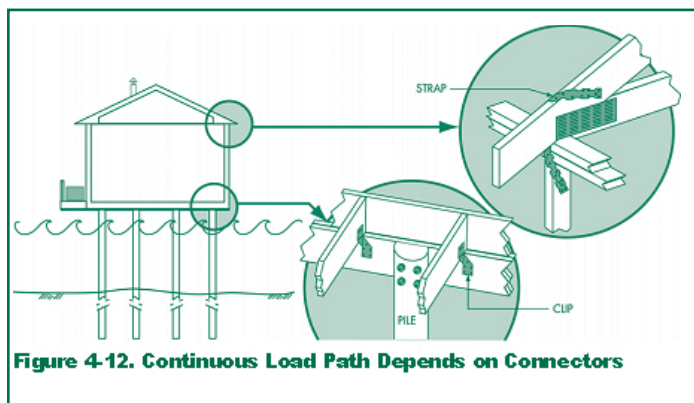


Figure 4-12. Continuous Load Path Depends on Connectors

#### C. FREE OF OBSTRUCTION BELOW BFE

The NFIP regulations require that the space below the lowest floor be free of obstruction or built with breakaway walls. Obstructions that are attached to the supporting columns or piers will be subject to flood and wave forces, and those forces can exert damaging stresses on the building. Enclosed utility cabinets, tool sheds, and storage units are obstructions. Technical Bulletin 5-93 Free-of-Obstruction Requirements is included in Appendix F.

#### D. STRUCTURAL FILL IS PROHIBITED

Buildings in V Zones, including substantial improvements, must be elevated on properly designed foundation systems which allow unobstructed flow of velocity waters (see Technical Bulletin 5-93). The NFIP regulations prohibit the use of fill to support buildings because fill and sandy soils are easily eroded. Nonstructural fill, such as might be used for landscaping, should be placed so that it does not divert waves and surging floodwaters onto other structures.

#### E. ENCLOSURES BELOW BFE IN V-ZONES

The NFIP does not limit the size of enclosures below elevated buildings in V Zones. However, you should know that there are some financial implications for owners. Enclosures over 299 square feet are rated by the NFIP using very high rates. Remember that enclosed areas are limited in use – rarely do those uses require enclosures that are as large as 299 square feet, much less larger ones.

#### Basements Prohibited

Enclosed areas may not be subgrade (below ground level) on all four sides. Technically, this would create a basement, even if it is subgrade by only an inch or two. In sandy areas where wave energy is high, elements below-grade may increase scour which undermines the building.

#### Breakaway Walls

In coastal high hazard areas where wave energy is high, elevated buildings must be designed to minimize the forces or loads that act on the foundation. Any building elements below the base flood elevation will be subject to forces, so it is important to minimize all obstructions. The concept behind non-supporting, breakaway walls is that under certain wave/flood conditions the walls will collapse to prevent transferring forces to the foundation.

The NFIP regulations specify that breakaway walls must be intended to collapse under wind and water loads without causing damage to the building or supporting foundation system. Specifically, the minimum standard requires collapse under a design safe loading resistance of not less than 10 and no more than 20 pounds per square foot. Walls with higher resistance must be certified by a registered professional engineer or architect that the design meets certain conditions (NFIP regulations at 60.3(e)(5)). NFIP Technical Bulletin 9-99 Design and Construction Guidance for Breakaway Walls Below Elevated Coastal Buildings is in Appendix F.

#### **Restrictions on Use**

Same as for restrictions for enclosures below the BFE for A Zones.

#### **Utilities and Equipment**

Do not allow utilities to be attached to or pass through breakaway walls. Post-flood investigations show it can cause undesired forces and contribute to damage. Otherwise, the same as for restrictions for enclosures below the BFE for A Zones.

#### **Water Resistant Materials**

Same as for restrictions for enclosures below the BFE for A Zones.

#### **Flood Openings/Vents**

Flood openings are not normally specified for enclosures in V Zones. If you adopt the Coastal A Zone approach, more than likely you will expect to see flood openings in breakaway walls for enclosures under buildings in those areas.

### **F. COASTAL BARRIER RESOURCE AREAS**

In coastal areas, when the flood zone and BFE must be verified be sure to check for whether the area is shown as CBRA or Otherwise Protected Areas. By an Act of Congress, NFIP flood insurance is not available for new buildings or substantially improvements of

existing buildings in these areas and federal disaster assistance for individuals is limited to emergency relief. However, the construction standards of the NFIP and your floodplain management ordinance still apply and permits must still be reviewed and issued. If by chance a policy is written, a claim will not be honored and the owner will be reimbursed for premiums paid in error over a certain period of time.

### **G. ALTERATION OF SAND DUNES**

In V Zones, the NFIP regulations prohibit manmade alteration of sand dunes that increase potential flood damage. This is interpreted to mean any reduction in the elevation or mass of the dune, including excavating into a dune for the purpose of placing a foundation. Dunes are natural barriers to flooding, so it is difficult to alter a dune without increasing potential flood damage.

## 4.8 ADMINISTRATIVE PROVISIONS FOR FLOODPLAIN DEVELOPMENT

### A. DEVELOPMENT PERMITS ARE REQUIRED

The NFIP does not allow construction or development in an identified flood-hazard area without a permit from the community. This regulation, which is located in section 60.3(b)(1), states that the community must “Require permits for all proposed construction and other developments including the placement of manufactured homes” within special flood-hazard areas. This means that your community may issue a permit only if the proposed development meets the standards of the NFIP outlined in this chapter.

It is important to note that the concept of development goes beyond the traditional building permit. While the building permit is limited to buildings, the development permit includes buildings and alterations to landscape, such as excavation or use of fill—any change that would affect drainage patterns or the flood-carrying capacity of the watercourse.

### B. CONSEQUENCES OF NON-COMPLIANCE

Enforcement of the floodplain ordinance must not be taken lightly. Your community is violating its agreement with the NFIP by failing to strictly maintain a permit system, by granting variances regularly, and by being lax about enforcing responsibilities.

If your community does not participate in the NFIP, or if it is suspended from the NFIP for failure to enforce an effective floodplain ordinance, the following consequences could occur:

- Flood insurance will not be available. Residents will not be able to purchase a flood insurance policy.
- Grants or loans for buildings in identified special flood-hazard areas of communities not participating in the NFIP will not be approved by federal agencies, including Housing and Urban Development, the Small Business Administration, and the Economic Development Administration.
- Federal mortgage insurance will not be provided in identified flood-hazard areas by the Federal Housing Administration (FHA), the Veterans’ Administration (VA), or the Farmers Home Administration.
- In the event of a federally declared flood disaster (for example, a flood, tornado, earthquake), federal or state disaster assistance may not be available to nonparticipating communities.
- Property of buyers or lessees will not be eligible for disaster assistance, if the property is in the flood hazard area of a nonparticipating community. (Lenders making conventional mortgage loans in these areas are required to notify buyers or lessees, if this situation applies to them.)
- Unsafe construction may become prohibitively expensive, and therefore un-sellable, if the community ever decides to participate or re-enter the NFIP. This is because actuarial insurance rates go into effect when FIA establishes base-flood elevation data, regardless of whether or not a community participates in the program. These actuarial rates may make the flood insurance too expensive—as much as \$25 per \$100 of coverage. Without flood insurance, lending institutions will not approve loans in flood hazard areas.

## C. RECORD KEEPING

The following records must be kept on file and open for public use:

1. A complete and up-to-date copy of the floodplain ordinance, the flood map (FHBM or FIRM), and the Flood Insurance Study (FIS) or the best flood-hazard data available for the area and use it in regulating floodplain development.
2. The elevation of the lowest floor (including the basement) of all new or substantially improved structures in the special flood-hazard area, as required by NFIP regulations. For flood-proofed structures, the elevation to which they have been flood-proofed must be obtained and recorded.
3. A project file for each development permit application. This file should contain:
  - a copy of the permit application;
  - a copy of the permit review checklist;
  - copies of all pertinent correspondence relating to the project;
  - documentation of inspections of the development; and
  - base-flood elevation data for subdivisions of 5 acres or 50 lots or larger;
  - pre- and post-construction certification forms for flood-proofing and post-construction certification forms indicating the lowest floor elevation of all structures.
4. Biennial Reports that must be submitted to FEMA every other year. The Biennial Report will be easy to complete if this information is readily available in one place.
  - copies of previous years' reports;
  - a running total of permits and/or variances granted in the flood-hazard area;
  - maps of new annexations or other boundary changes;
  - census data; and
  - record of any major natural or man-made changes affecting flooding patterns.

## D. SUBSTANTIAL DAMAGES AND IMPROVEMENTS

Substantial improvement is defined as any repair, reconstruction, or improvement of a structure with a cost that equals or exceeds 50% of the market value of the structure before the start of the improvement or repair. Substantial improvement also includes buildings that have suffered substantial damage from any cause (fire, tornado, hurricane, earthquake, wind-blown debris, falling objects, flooding, etc.). Damage is considered to be substantial if the cost to repair and restore the building to its pre-damage condition equals or exceeds 50% of the market value before the damage occurred. A good resource to help you and your citizens with all aspects of substantial improvement is FEMA 213, Answers to Questions About Substantially Damaged Buildings.

Substantial improvement to structures can also be an addition, a renovation, or both. For this definition, improvement is considered to occur when the alteration of any wall, ceiling, floor, or other structural part of the building commences, whether or not that alteration affects the external dimensions of the structure.

Substantial improvement does not include improvement to comply with state or local health, sanitary, or safety code specifications solely necessary to ensure safe living conditions. Substantial improvement also does not apply to the alteration of a structure listed in either the National Register of Historic Places or the State Inventory of Historic Places.

### Additions

When an addition is a substantial improvement, the local floodplain administrator must require the entire structure to be brought into compliance with the local floodplain management ordinance and flood resistant construction provisions of the building code such as elevating to base-flood elevation. For additions that are determined by the local floodplain administrator not to be "substantial", i.e., the cost of the work proposed

is less than 50% of the market value of the existing building (or the percent specified in the ordinance), the addition will be required to be built compliant with the specifications in the ordinance or building code but the existing structure will not.

### **Renovations**

When a substantial improvement is a renovation, the regulations apply to the entire structure. For example, if the work includes rewiring, new plumbing, siding, painting, or similar activity, but does not include a change in exterior dimensions, the structure itself must be elevated, so that the lowest floor is at or above the base flood level. If the renovation is not a substantial improvement, then the owner is not required to bring the building into compliance but there are many other things that can be done to reduce future flood damage. The owner should consider these measures:

- Use flood-resistant materials below the BFE, such as closed-cell wall insulation and polyvinyl wall coverings.
- Raise air conditioning equipment, heat pump, furnace, hot water heater and other appliances on platforms, even if a small addition needs to be building.
- Install electric outlets higher above the floor.
- Move ductwork out of crawlspaces.
- Retrofit crawlspaces with flood openings.
- Fill in below-grade crawlspaces or utility areas.

### **Phased Improvements**

A small number of property owners try to get around the substantial improvement rule by deliberately phasing improvements. This loophole is typified by the person who, this month requests a permit for an improvement that costs less than half of market value, and in a couple of months will request a permit to do additional work. While each individual permit represents less than a substantial improvement, the cumulative improvements over time certainly are substantial.

Unless there is a state or local regulation that takes cumulative damages into consideration for substantial

damage determinations, FEMA has no rule telling you how to handle these situations. Therefore, interpretation remains with each local floodplain administrator. A conservative and consistent approach is recommended. Each permit applicant should be made fully aware of the substantial-improvement regulations at the time the first permit is requested. The administrator should keep good records of the number of permits granted for each structure and the cumulative cost.

When the total equals or exceeds half the market value of the structure when the first improvement began, no additional permits should be issued, unless the entire structure is brought into compliance with the NFIP regulations.

### **Making Structures Compliant**

For buildings that do not conform with the NFIP rules, which includes pre-FIRM buildings with the lowest floor below BFE, the 50% rule means the original buildings have to be brought into compliance. This usually means the original building has to be elevated – lifted off its foundation and raised above the BFE. It also means that basements have to be filled, crawl space foundations must be retrofit with flood openings, and electrical and mechanical service equipment must be elevated. Non-residential buildings can be retrofitted with flood-proofing measures, but be extra careful and require certified designs by qualified architects and engineers.

### **Substantial Damage Determinations**

Remember that the value of the building is not the “sales price” of a property, because that value includes the value of the land. FEMA’s rules require that the building value be the “market” value before the improvement or before damage occurred. Replacement cost, which are usually much greater than the market value, cannot be substituted for market value. You can require the applicant/owner to obtain a professional market appraisal. As a screening tool only, you can estimate the market value by using tax assessment

values, if adjusted to current value. Replacement cost is not the same as market value, but replacement cost can be used if it is depreciated to reflect the age of the building. You should pick an approach and consistently apply it.

You have several options to determine the cost of improvements and repairs. The most straight-forward is to have the applicant get an estimate from a reputable contractor. You have to include all design and construction costs, including structural building parts, utility and service equipment, finish materials, and labor. Finish materials include lighting fixtures, built-in appliances and cabinets, interior moldings, tiling, installed carpet, and other similar items are also included. Another way to estimate costs is to use regionalized construction costs based on the square footage of the proposed work.

There are only a few costs that are not included: plans and specifications, survey costs, and permit fees, debris removal, landscaping, accessory structures, swimming pools, and fences. Also, do not include costs to correct previously identified violations of health, sanitary, or safety code that are the minimum necessary to assure safe living conditions.

### **Maintain Records of Determinations**

Some communities use a valuation worksheet for every permit for improvements, additions, and repairs. This way, a record of good practice is established. Remember, it is just as important to show you determined that an improvement or repair is less than substantial. You should make the determination for every permit for existing buildings in the SFHA and keep copies with permanent permit records.

### **Preparing for Post-Damage Determinations**

Following any major disaster, especially one that involves flooding and wind damages, it can become daunting and very difficult to do a good job of determining damages for a plethora of structures in a community. In addition, this is when

many people's home that are damaged become anxious to get back to normal and their tolerance for waiting on a local official to determine what has to be done to their home is very limited. FEMA knows this is a difficult period and has prepared the "Residential Substantial Damage Estimator" (RSDE) program to help. In addition to local resources, FEMA and the State NFIP Coordinator can be requested to provide training and to help identify and review buildings that need permits to repair. FEMA's packet includes damage level descriptions, an inspection report form, and placards to post on buildings. Order the CD-ROMS with the RSDE program by calling 1 (800) 480-2520. Communities that are exposed to repetitive flooding should develop handouts designed to help for property owners understand the substantial damage determination process.

When you're estimating the cost to repair substantially damaged buildings, you can use the approaches outlined above. If the situation is urgent, you can request a copy of the insurance adjuster's worksheets or Proof of Loss Statement. The actual cost of repairs may be more than the amount of damage claimed. This could be a result of the adjuster not including all costs to fully repair because NFIP flood insurance doesn't cover all elements of a building that may be damaged.

Sometimes homeowners want to perform some of the repairs themselves. The NFIP requires that you estimate the fair market value of the labor and material (even donated materials) and include them in the cost of repairs for all damages sustained.

## E. INCREASED COST OF COMPLIANCE

When a building in the SFHA that is insured by the NFIP sustains substantial damage by flooding, the policy holder is eligible to file a claim for Increased Cost of Compliance (ICC) payments. Authorized in 1994, this coverage is included in every policy on buildings in the SFHA (excluding buildings covered by group policies and condominiums).

ICC is designed to help the policy-holder (property owner) pay to bring the building into compliance with the ordinance. Because compliance may mean physically raising the building above the BFE on a new foundation, the costs can be significant. When buildings cannot be repaired, ICC payments can be used towards demolition and some costs of reconstruction (related to foundation only). As of May 1, 2003, ICC offers up to \$30,000, in addition to the basic claim payment.

In order for the policy-holder to collect a claim from the insurance company, the local floodplain administrator must provide the following information to the insurance adjuster:

- Provide written evidence of the official determination that the structure is substantially damaged,
- Consult with the owner about measures that will bring the building into compliance,
- Issue the permit for the work, and
- Inspect the work for compliance.

## 4.9 HIGHER STANDARDS

### A. RESTRICTING DEVELOPMENT OF HIGHLY VULNERABLE BUILDINGS AND CRITICAL FACILITIES FROM FLOOD HAZARD AREAS.

Critical facility protection was first introduced as a concept in the federal Water Resource Council's Floodplain Management Guidelines published in 1978, which explained how to implement Executive Order 11988 – Floodplain Management. Certain facilities, are considered to be “critical” developments because they are critical to the community's public health and safety, are essential to the orderly functioning of a community, store or produce highly volatile, toxic or water-reactive materials, or house occupants that may be insufficiently mobile to avoid loss of life or injury. Examples of these facilities include, jails, hospitals, schools, fire stations, nursing homes, wastewater treatment facilities, water plants, and gas/oil/propane storage facilities.

These developments, due to their impact on human safety, health and welfare, must have a higher degree of protection than the base flood provides. The emphasis of this standard is on the increased hazard to life and health as opposed to property damage.

Your community may want to prohibit certain types of development within the floodplain, especially those that present a significant hazard to persons living downstream. These include landfills, sewage treatment plants, cemeteries, hazardous chemical plants and warehouses, as well as other similar kinds of development that could cause widespread public health and safety problems in the event of flood damage.

Emergency facilities that are critically needed in times of flooding could also be excluded from the floodplain or any other area where they would be cut off in case of flood. These include fire stations, ambulance services, and emergency management offices.

## **B. UTILIZING FREEBOARD OR FLOOD PROTECTION ELEVATIONS**

While the NFIP only requires protection to the level of the 100-year flood, many communities in Virginia require structure to be elevated to 1 or 2 feet above the 100-year flood elevation. This added level of protection is called a freeboard safety factor. It represents a margin of safety against possible errors in estimating flood levels and possible increases in flood heights caused by extensive watershed development or obstruction of floodplain areas. Property owners who protect their structures above the 100-year flood elevation may be able to obtain reduced insurance rates.

A “freeboard” is a safety factor usually expressed in feet above a flood level for the purpose of floodplain management. Generally, freeboard tends to compensate for the many unknown factors that could contribute to flood heights greater than the height calculated for the base flood and conditions such as wave action, obstructed bridge openings, debris and ice jams and the effects of urbanization in a watershed. However, where no detailed 100-year flood elevation data are available in NFIP approximate A Zones or in AO Zones (shallow flooding), elevation of a structure’s lowest floor at least two feet above the highest adjacent natural grade touching the structure will ensure some positive drainage away from the structure.

Another advantage of an A Zone freeboard is the reduction in the cost of flood insurance. The insurance rates for new structures in SFHA’s is directly related to their lowest floor elevation compared to the base flood elevation. In approximate A Zones, rating is based on a comparison of the lowest floor elevation to either a “base” (100-year) flood elevation that is calculated or estimated using standard engineering practices, or alternatively, based on the elevation of at least two feet above grade. For example, based on NFIP rating information (as of May 1, 2002) the annual flood insurance rate for \$50,000.00 coverage for a single family home with no basement built without an

estimated base flood elevation at only one foot above highest adjacent existing grade would be \$500.00, while if the structure is built with the lowest floor at between two and four feet above the highest adjacent natural grade the rate would be only \$275.00.

Disadvantages of freeboard include potentially increased construction costs for structures, and more fill being placed in the SFHA if the method for elevating the structure is a fill pad. The impact of additional fill is the loss of floodplain storage for flood waters. Also, because the construction is only tied to the highest adjacent natural grade, some site planning and additional surveying should be involved in order to attempt to identify the higher ground on the site. And, because there is no actual estimated base flood elevation, the structure could still be affected by actual flooding.

## **C. LOWERING SUBSTANTIAL IMPROVEMENT ENFORCEMENT “TRIGGER”**

Some communities adopt different substantial improvement/damage thresholds. For example, some CRS communities use 40% or 30% rather than 50% to trigger compliance. FEMA supports higher standards because in the long run it means that flood hazards and potential damage will be reduced. Another higher standard is a cumulative substantial improvement regulation. This means you would have to track permits over time and require compliance when 50% of market value is achieved. Check with the State NFIP Coordinator to learn more.

## **D. UTILIZING CUMULATIVE SUBSTANTIAL IMPROVEMENT**

Some communities modify their ordinances so the value of all improvements permitted over several years is tracked. When the cumulative value exceeds the substantial improvement value, then the requirement to comply is triggered. The most important thing to keep in mind is the kind of record keeping that you'll need to make this work. Remember, you'll need to be prepared to keep records for years, and may have to handle situations that become complicated by changes in ownership.

## **E. RESTRICT RECONSTRUCTION OF DEMOLISHED STRUCTURES IN FLOODWAYS**

A community may want prohibit replacement of a demolished structure, which would reduce the flood hazard for other structures in the adjacent floodplain area.

## **F. ACCESS DURING FLOOD CONDITIONS**

The provision of access routes is a safety factor for floodplain development, in order to ensure that occupants of the floodplain may be able to safely evacuate or enter into flood hazard areas during flood conditions. In times of flooding, roads, streets and bridges in low-lying areas may be covered by floodwaters, isolating building occupants. Ingress (access into an area) and egress (access out of an area) is vital to police and fire/rescue personnel and equipment, and to the community generally, for the safe and orderly evacuation of flooded areas. Access criteria are often linked to "freeboard," or elevation of a building, street, bridge, etc. usually expressed in feet above a flood level for the purpose of floodplain management. Generally, access is desired at least at the 100-year flood level.

From a planning standpoint, in some areas low topography at bridges and approaches and along

stretches of roads may not allow for a safe access route. Disadvantages of designed and constructed access include potentially increased construction costs for structures, and more fill being placed in the SFHA if the method for providing the access is fill. The impact of additional fill is the loss of floodplain storage for floodwaters and possible changes in storm-water runoff. Careful site design is needed, including identifying areas of higher ground within or adjacent to the floodplain for access routes. However, the intent of providing safe access to properties in flood prone areas may outweigh design considerations.

## **G. PLANNING, ZONING AND ADMINISTRATIVE TOOLS**

The best time to achieve one of the goals of the NFIP – guide development to less flood-prone areas – is before you have a building permit application on your desk. And the best way to influence where people build is through application of your planning and zoning ordinances.

### **Low Density Zoning**

In communities that use zoning to guide how they grow and develop, one approach for managing floodplain development is to adopt a low density zoning requirement. For example, instead of 4 or 5 units per acre, if the floodplain is zoned for one building or one unit per acre, then the total number of exposed buildings is limited. The Community Rating System provides credit for low density zoning, with maximum credit provided for minimum lot sizes of 10-acres or larger.

### **Floodplain Density Adjustment**

Density adjustment is a tool that can take into account the presence of a floodplain without overly restricting the use of a parcel of land. Strictly speaking, if an area is zoned at 4 units per acre, then someone who owns 10 acres expects to be able to subdivision and construct 40 units. But suppose 2 acres of that 10-acre parcel is in the mapped floodplain. If those 2 acres are

kept as open space, then the density of the remaining non-floodplain acreage could be adjusted to 5 units per acre. Thus the developer would still achieve a total of 40 units – and in the process gain a valuable, green space asset.

### **Non-Conversion Agreement for Enclosures Below BFE**

NFIP regulations allow enclosures, but only for building access, parking, and limited storage, and then only if adequate water-equalizing openings are installed. Conversion of enclosures to habitable space is a growing concern. The value of the NFIP restrictions on enclosures is apparent after floods. One recent investigation, conducted after a major hurricane, examined post-FIRM buildings in a coastal community. Almost without exception, damage to post-FIRM homes was due to non-compliant conversions of enclosures.

A Non-Conversion Agreement is one way to help address the problem (sample in Appendix E). By signing this Agreement, homeowners agree to maintain the flood openings and to limit the use of such areas to parking, access, and limited storage. Copies are kept in permanent records and may be useful to document compliance in the future, especially after a flood. Some communities require that the Non-Conversion Agreement be recorded as a deed restriction. Doing so will help ensure that future buyers are aware of the ordinance standards, which may reduce non-compliant conversions.

## **H. UTILIZING SET-BACKS AND OPEN SPACE**

One of those goals is “guide development away from high risk areas.” Simply applying regulations that govern how to build in the floodplain does little to achieve that goal. There are a number of ways that you can encourage exposure to flooding by looking at the site.

### **Setbacks:**

- Allow the use of the floodplain as a natural retention area slows flood peaks downstream.
- Can be used in conjunction with or in lieu of NFIP floodway delineation to keep proposed development out of that portion of the floodplain subject to deeper, higher velocity flow that in larger floods is often accompanied by debris or ice jams.
- Retard direct soil erosion into the stream by minimizing disturbance along valley slopes adjoining the stream and floodplain.
- Assure natural stream functions and allows for stream dynamics such as channel migration (meanders) over time.
- Help to maintain and enhance water quality by allowing the stream to flood, spilling its load of suspended sediments and dispersing pollutants that degrade water quality, thus lessening the need for more expensive or additional water and wastewater treatment systems.
- Allow communities participating in the NFIP's Community Rating System to receive credits to reduce flood insurance premiums borne by policyholders.
- In a planning and zoning context are a compatible term with building lot and road setbacks that can be adjusted to accommodate the riparian area.

### **Preserve Floodplains as Open Space**

Regulations can be written to require that floodplain areas be preserved during the subdivision process or as large, single lot developments are designed. This works as long as there is non-floodplain land available. Where there are no alternative locations, it is still valuable to encourage as much open space floodplain as possible. In some parts of the country, open space along waterways and passive recreation in floodplain areas are known to enhance the value of homes in subdivisions and throughout the community.

### **Flood Protection Setback – Riverine**

The NFIP minimum requirements don't address where on a lot a building is built, only how high it will be elevated or otherwise protected. Some communities find it valuable to adopt a flood protection setback, especially when they are trying to meet multiple objectives such as water quality or streamside habitat enhancement. Within the setback, natural vegetation should be left or replanting should be required.

A good rule of thumb for flood protection setbacks along smaller waterways is 100' back from streambanks

where FEMA has mapped the SFHA. Where streams are shown and a floodplain has not been defined, then the setback may be 50' or 100'. One question usually comes up during consideration of a setback – some floodplains are narrower than the setback. The way to handle this is to craft language that says buildings will be set back the lesser of the setback distance or the width of the floodplain.

### **Coastal Setback from Mean High Tide or Other Reference Feature**

Tidal shorelines along Mississippi's Gulf Coast and bays are subject to flooding from hurricanes and tropical storms. If a V Zone is identified, then two NFIP criteria affect where a building is placed on the lot. Buildings must be landward of the reach of mean high tide and dunes may not be altered unless it is demonstrated that the potential for flood damage is not increased by those alterations. If an A Zone is identified, there are no NFIP minimum criteria that guide where the building is sited.

A good measure to include in your ordinance is to require that buildings be located a certain minimum distance back from mean high tide or a specific reference feature. Often, the reference feature is tied to an evaluation of long-term erosion rates. In areas with active erosion, the life of a building will be extended if it is further back from the water.

## **I. UTILIZING MORE EFFECTIVE BUILDING PROTECTION MEASURES**

### **Alternative Analysis for Methods of Elevation**

We're all familiar with beach houses that are elevated on pilings, but this method of elevation is not very common along many riverine waterways. All too often, without even thinking about it, we encourage fill by not suggesting that property owners consider different means of elevation. Alternatives to filling should always be considered. Stem walls take up some floodplain volume, but less than if fill is used; stem walls involve structural foundation walls filled with earth and topped with a slab.

## **Elevate All Manufactured Homes to the Same Standard**

The NFIP regulations allow manufactured homes to be placed at different elevations, depending on various circumstances. When a community implements the minimum standards, it means different citizens are being protected to different levels of safety. A simple standard to implement is to require all manufactured units be elevated to the same level as all other buildings.

### **Apply V Zone Standards in Coastal A Zone**

The Coastal A Zone means the portion of the SFHA landward of the V Zone or landward of a shoreline that does not have a mapped V Zone if the conditions support waves. The principle sources of flooding in coastal A Zones are not riverine, but astronomical tides and storm surges.

Many flood maps for coastal areas show two zones – the V Zone right along the shore and the A Zone immediately landward of the V Zone. The concept of a "Coastal A Zone" is new. V Zones are delineated where the still-water depth can support a 3-foot breaking wave. It should be obvious that waves of that size do not simply disappear where FEMA draws the line between the two zones.

Because at least a portion of the A Zone experiences breaking waves, erosion, and transport of sand, the concept of the Coastal A Zone has been put forth by some experienced coastal engineers and others. To account for breaking waves that are less than 3-feet, Coastal A Zones can be delineated breaking wave heights greater than or equal to 1.5 feet during the base flood are expected landward of the V Zone (and landward of an open coastal shoreline where V Zones have not been mapped).

Post-flood field investigations in areas inland of V Zones, and laboratory testing, have indicated that significant structural damage occurs in these areas. The observed damage is directly associated with

wave impacts. Therefore, it is reasonable to apply the V Zone requirements in the Coastal A Zone. To do so, you should delineate the Coastal A Zone on your flood map and make it available to the public.

## **J. COMPENSATORY STORAGE**

Sometimes referred to as “cut and fill,” this type of provision requires the compensation for filling or other construction in the floodplain by removal of an equal amount of material from the floodplain near the proposed development. This helps to maintain the general cross-sectional area and floodplain storage volume at that location and ensure that floodwaters will not be displaced onto someone else’s property as the result of a floodplain fill.

In some situations due to factors such as property ownership, density of land use activity in the floodplain, or topographical constraints, sufficient land may not be available for excavation and removal of material to offset the placement of fill or building construction. The adoption of a freeboard for filling may mean a greater amount of excavation is needed to compensate for the increased fill volume. For large development sites where parking space constitutes a significant portion of the development, alternatives to filling the parking area should be evaluated to allow for floodwater storage, especially near or within regulatory floodways. Also, recommended “best management practices” for reducing soil erosion should be utilized especially when excavating and filling in areas close to streambanks or on steeper slopes.

## **K. FUTURE CONDITIONS MAPPING**

“Future conditions hydrology” means the flood discharges associated with projected land-use conditions are based on a community’s zoning map and/or comprehensive land-use plans, and the 1% chance annual floodplain is based on future hydrology conditions shown on a community’s FIRM. Future development in the drainage area for a stream will

increase the amount of impervious area and reduce the timing of runoff, causing the peak flow in a stream to increase during heavy rains. When this happens, structures built to current standards (i.e., to the base flood elevation on the community’s FIRM) may be damaged by a storm that has a higher frequency of occurring.

Until recently, NFIP regulations did not allow for mapping of floodplains on a FIRM based on future conditions; however, FEMA has issued new guidelines and regulation changes to allow new or updated FIRMs to show both the existing conditions 1% annual chance floodplain (designated as Zone A Special Flood Hazard Areas) and the future conditions 1% annual chance floodplain. If a community or state chooses to develop and submit the required information, FEMA will show the future conditions 1% chance annual floodplain as a shaded Zone X and designate it Zone X (future base flood). Only the existing conditions 1% chance annual floodplain will be shown on the FIRM. The future conditions 1% annual chance flood elevations will be included in the flood profiles and data tables in the Flood Insurance Study report. The base flood elevations will be used for mandatory flood insurance purchase requirements of the NFIP. Communities would be able to regulate development in the future conditions floodplain with proper regulatory changes.

Adoption of this standard may prevent loss of life and property because elevated construction is safer during a flood event (adopting a freeboard also does this). The lowest floor elevation has a direct impact on the flood insurance rates for a structure and any structure built using future conditions standards will be rated based on its lowest floor above the existing conditions base flood elevation. Also, the “effective life” of a FIRM is extended if future conditions are mapped.

Disadvantages include the additional cost for elevating structures to the future conditions levels. Also, future conditions mapping would be an additional cost above the amount to produce a detailed study floodplain.

# CHAPTER 5: STRATEGIES FOR PROACTIVE FLOODPLAIN MANAGEMENT

## 5.1 PROGRAMS TO ENHANCE LOCAL FLOODPLAIN MANAGEMENT

### A. FEMA'S COMMUNITY RATING SYSTEM

#### Overview

The Community Rating System (CRS) is a voluntary program that establishes incentives for communities to reduce the rates their residents pay for flood insurance. This optional program rewards those communities that are doing more than the minimum NFIP requirements to help their residents prevent or reduce flood losses.

Since the NFIP was established in 1968, it has been successful in requiring new buildings to be protected from damage by 100-year floods. However, the insurance rates are the same in all participating communities, even though some do much more than regulate construction of new buildings to meet the national standards. The CRS takes the NFIP process a step further by providing an incentive for communities to initiate new flood protection activities that can be even more effective.

#### Brief History of CRS

The CRS program, which was established in 1987, works in much the same way as the fire insurance public protection program that was established in the United States in the early 1900s to encourage local officials to maintain or improve their fire protection programs.

In order to maintain favorable fire insurance rate classes for their communities, local governmental bodies agree to meet or exceed the insurance industry's minimum standards for fire alarm communications, water supply and distribution, and overall fire department facilities. Those standards address staffing, equipment, training, and other items.

The CRS was organized in the image of the fire protection program by the Federal Insurance Administrator (FIA), insurance companies, and state

and local floodplain managers. Communities and public interest organizations were also involved in reviewing and field testing the program.

#### Mission and Goals

CRS mission and goals are "to encourage, by the use of flood insurance premium adjustments, community and state activities beyond those required by the National Flood Insurance Program to:

- reduce flood losses,
- facilitate accurate insurance rating, and
- promote the awareness of flood insurance."

#### Community Classifications

If your community decides to participate in the CRS, it will be assigned a classification that determines what flood insurance premium credits are available to the residents. There are 10 classes, with Class 1 having the greatest premium credit, and Class 10 having no premium credit.

Your community's CRS class is based on your number of credit points that have been calculated for the activities that you have undertaken to reduce flood losses, to facilitate accurate insurance rating, and to promote the awareness of flood insurance. A community is automatically in Class 10 unless it applies for CRS classification and shows that the activities it is implementing justify a better class. The amount of premium credit for each class is published annually by FIA.

#### Applying for CRS

Your community's application for CRS classification is voluntary. You can qualify if you are in full compliance with the rules and regulations of the NFIP. To apply, the first step is to submit documents showing that the community is implementing one or more of the activities recognized in the CRS Schedule.

For more information about the CRS and the application process, call the Virginia DCR's Floodplain Management Program staff at (804) 786-8073 or (804) 371-2630.

### **CRS Activities to Get Credit For**

The CRS Schedule identifies 18 creditable activities, organized under four categories: public information, mapping and regulations, flood damage reduction, and flood preparedness. They are listed at the end of this chapter. The CRS Schedule assigns credit points based on how well an activity affects the three goals of the CRS. Communities are welcome to propose alternative approaches in their applications.

Some of the activities may have been implemented by the state or a regional district, rather than at the local level within your community. For example, some states have disclosure laws that may meet the credit criteria of Activity 340 on flood-hazard disclosure. In such cases, any community in those states or districts could receive credit points, if the community applies for a CRS classification, and if the state or district program is, in fact, being implemented in the community.

### **Application Review by State and Federal Agencies**

In Texas, the Denton Regional Office of FEMA and the TNRCC, the state NFIP coordinator, review and comment on the application. FIA verifies the information and the community's implementation of the activities. FIA also sets the credit to be granted and notifies the community, the state, the insurance companies, and other appropriate parties.

The community's activities and performance are reviewed periodically. If it is not properly or fully implementing the credited activities, its credit points and possibly its CRS classification will be revised. A community may add or drop creditable activities each year. Credit criteria for each activity may also change as more experience is gained in implementing, observing, and measuring the activities.

### **Resource Requirements Versus Benefits**

There is no fee to apply for CRS classification or participation in the CRS. Because there may be a cost to implement the creditable activities, some communities may be concerned about whether the cost of initiating a new activity will be offset by the flood insurance premium credits.

Consider the following benefits as you evaluate the cost effectiveness of activities credited under the CRS:

- reduction in flood insurance rates,
- increased public safety,
- reduction of damages to property and public infrastructure,
- avoidance of economic disruption and losses,
- reduction of human suffering, and
- protection of the environment.

Your community should also prepare and implement those activities that best deal with the local flood problem, not just those items that are listed in the CRS Schedule.

## Schedule of Activities Credited under the CRS

The sections listed below show activities your community can implement to get credit points for lower insurance rates. (Sections 100 and 200 cover other topics in the CRS Schedule.)

CRS Activity	Maximum Possible Points	National Average
<b>300 Public Information Activities</b>		
<b>310 Elevation certificate:</b> maintain FEMA's elevation certificate and make copies available to inquire.	162	72
<b>320 Map determinations:</b> respond to inquiries about flood zones and data from the Flood Insurance Rate Map.	140	168
<b>330 Outreach projects:</b> advise residents about the flood hazard, flood insurance, and flood protection measures.	315	80
<b>340 Hazard disclosure:</b> advise potential purchasers of flood-prone property about the hazard.	81	21
<b>350 Flood protection library:</b> maintain and publicize a library or references on flood insurance and flood protection.	66	22
<b>360 Flood protection assistance:</b> provide direct advice to property owners desiring to protect themselves from flooding.	71	57
<b>400 Mapping and Regulatory Activities</b>		
<b>410 Additional flood data:</b> develop new flood elevations, floodway delineations, wave heights, or other regulatory flood-hazard data.	1,373	56
<b>420 Open space preservation:</b> credit is provided according to the amount of vacant floodplain that is kept free from buildings and filling.	900	113
<b>430 Higher regulatory standards:</b> regulations that require new development to be protected to a level greater than the NFIP rules.	2,720	100
<b>440 Flood data maintenance:</b> make the community's floodplain maps more current, useful, or accurate.	231	66
<b>450 Storm water management:</b> regulate new developments throughout the watershed to minimize their impact on surface drainage and runoff.	670	105
<b>500 Flood Damage Reduction Activities</b>		
<b>510 Repetitive loss projects:</b> develop and implement a plan to mitigate losses in repeatedly flooded areas.	309	79
<b>520 Acquisition and relocation:</b> purchase or relocate buildings and convert flood-prone properties to open space.	3,200	140
<b>530 Retrofitting:</b> credit is provided according to how buildings have been retrofitted to protect them from flood damages.	2,800	43
<b>540 Drainage system maintenance:</b> conduct periodic inspections and maintain the capacities of the channels and retention basins.	330	261
<b>600 Flood Preparedness Activities</b>		

## B. INCREASED COST OF COMPLIANCE

### Overview

Flood insurance policyholders who have suffered recent flood losses may apply for some extra help to cover the added costs they incur in rebuilding according to current local floodplain management ordinances.

Increased Cost of Compliance Program (ICC) coverage is available on NFIP policies written or renewed on or after June 1, 1997. The ICC is designed to help flood insurance policy holders take the steps required to reduce future flood damage to their homes or businesses by bringing their home or business into compliance with their community's floodplain ordinance. ICC assistance is available to each applicant only once, because the property owner is expected to achieve compliance with the first claim.

### Coverage Available for Eligible Activities

ICC coverage, which was mandated under the National Flood Insurance Reform Act of 1994, may pay up to \$30,000 to offset costs associated with the following kinds of construction associated with buildings that are substantially damaged or subject to repetitive flood loss:

- **Elevation.** Raising the home or business to or above the flood elevation adopted by the community.
- **Relocation.** Moving the home or business out of harm's way.
- **Demolition.** Tearing down and removing flood damaged buildings.
- **Flood-proofing.** An option available primarily for nonresidential buildings. It involves making a building watertight through a combination of adjustments or additions of features to the building that reduce that potential for flood damage.

### Policy Holders Eligible for Coverage

ICC coverage is only available for buildings that the community has designated as suffering substantial damage or repetitive loss. Policy holders with such property can only file a claim for the increased costs associated with repairing the building to flood-safe

standards. This coverage is adjusted separately from the flood damage claim filed under the standard flood insurance policy.

You are eligible to get ICC assistance if your property meets one of the following two conditions:

- Substantial damage exists when the policy holder's community certifies that a home or business has been damaged by flooding to the point that repairs will cost 50 percent or more of the building's pre-damage market value.
- Repetitive loss is only available in a community that has incorporated a repetitive loss provision in its floodplain management ordinance. Such a community must determine that the policy holder's home or business was damaged by a flood two times in the past 10 years. In each case, the cost of repairing the flood damage, on the average, must have equaled or exceeded 25 percent of the market value of the property at the time of the flood. This is called repetitive damage. Additionally, there must have been flood insurance claim payments for each of the two flood losses.

### **Application of ICC**

The substantial damage and repetitive loss determinations are made when the property owner applies for a building permit to begin repairing a flood-damaged structure, or during a post-flood survey by local building officials. If the community determines that the home or business is substantially or repetitively damaged, the local official will explain the floodplain management ordinance provision that will have to be met. The property owner should also consult the local official before making the final decision about which of the options to pursue.

The ICC contribution of \$30,000 is a significant contribution toward reducing future flood damage to a property. However, it may not cover all the costs associated with meeting community floodplain management laws and ordinances. Even though the property owner may have to pay a portion of the cost, the improvements should ultimately be reflected in increased property value and peace of mind.

## **C. NO ADVERSE IMPACT AND PROTECTION OF NATURAL STREAM FUNCTIONS**

### **A Problem That Needs Addressing**

Flood damage in the United States continues to escalate. From the early 1900's to the year 2000, flood damage in the United States has tripled, approaching \$6 billion annually. This has occurred despite billions of dollars spent on flood control and other structural and non-structural measures.

Why is this happening? Because as a nation we continue to build at risk on floodplains and to ignore the impacts of watershed development on other properties. Often, buildings, streets, utilities and other components of modern development that we thought were protected get flooded because of the actions of others. Communities are often confused about how to deal with legal challenges in the development process.

The NFIP has had an impact on the problem. Nearly 20,000 communities now manage floodplain development and new buildings are better protected from damage. The NFIP has slowed the increases in flood damage, but it has not stopped or reversed it. The reason is that most communities adopt and enforce only the minimum national and state floodplain management requirements, which focus on protecting new buildings, not what the impact of that construction will do to others.

## NFIP Minimums Are Not Enough

The NFIP's minimum requirements are just that—minimums! The minimums set construction standards that often do not provide sufficient protection from all local flood hazards nor do they account for the effects of urbanization on future flood levels. They will allow floodwater conveyance areas to be reduced; essential valley storage to be filled; or velocities to be increased; all of which can adversely affect others in the floodplain and watershed. It is important that local communities recognize the need to go beyond national and state minimums and take charge of their own flooding issues.

## Overview of No Adverse Impact

"No Adverse Impact" (NAI) floodplain management is a managing principle developed by the Association of State Floodplain Managers (ASFPM) to address the shortcomings of the typical local floodplain management program. Rather than depending on minimum requirements of federal or state programs, NAI provides tools for communities to provide a higher level of protection for their citizens and to prevent increased flooding now and in the future."

No adverse impact (NAI) floodplain management is an approach that ensures the action of any community or property owner, public or private, does not adversely impact the property and rights of others. An adverse impact can be measured by an increase in flood stages, flood velocity, flows, the potential for erosion and sedimentation, degradation of water quality, or increased cost of public services. No Adverse Impact floodplain management extends beyond the floodplain to include managing development in the watersheds where floodwaters originate. NAI does not mean no development. It means that any adverse impact caused by a project must be mitigated, preferably as provided for in the community or watershed based plan.

## Benefits of No Adverse Impact

For local governments, No Adverse Impact (NAI) floodplain management represents a more effective

way to tackle their flood problems. The concept offers communities a framework to design programs and standards that meet their true needs, not just the requirements of a federal or state governmental agency. The NAI floodplain management initiative empowers communities (and their citizens) to work with stakeholders and build a program that is effective in reducing and preventing flood problems. NAI floodplain management is about communities being proactive—understanding potential impacts and implementing prevention and mitigation activities before the impacts occur.

NAI has many benefits. By developing activities that really address your local situation and that do not harm others, your community can:

- Prevent flooding from increasing or damaging others;
- See a reduction in flood losses over time;
- Avoid challenges and lawsuits over causing or aggravating a flood problem; and
- Receive recognition for your efforts through the Community Rating System.

## Protection of Natural and Beneficial Functions

In their natural state, floodplains have enormous natural and beneficial functions that are often unrecognized. These complex dynamic systems contribute to the physical and biological support of water resources, living resources, and cultural resources. Undeveloped floodplains are important because they provide natural flood and erosion control, help maintain good water quality, and contribute to sustaining groundwater supplies.

Floodplains have biological resource value because they support a wide variety of plants and provide habitat for fish and wildlife. The cultural resources of floodplains include the harvest of natural products, places for recreation, scientific study, and outdoor education, and sites of historic and archeological interest.

Several purposes are served by protecting floodplains through dedicated easements and open space agreements. It helps to prevent flood damage to buildings and can reduce risks to public safety. When wetlands and other lands along waterways are left undeveloped, floods can happen without anyone thinking they're disasters. Even limited uses, such as passive recreation or athletic fields, are more acceptable than dense development. Flooded recreational fields may be unusable for a few days after floodwaters recede, but the fields can be restored to their pre-flood condition relatively inexpensively.

Not all communities will find it practical to protect all floodplains or floodways as open space, greenways, or easements. But even if only some areas can be protected, significant benefits will follow. Unfortunately, all too often we forget to count the damages avoided when dedicated open space floodplains fill up with water. We spend so much time helping people whose homes and businesses are damaged, that often we forget to notice the value of letting floodplains function as floodplains.

To learn more about the natural and beneficial floodplain functions, go to FEMA's web site and download a copy of *The Natural and Beneficial Functions of Floodplains: Reducing Flood Losses by Protecting and Restoring the Floodplain Environment* (FEMA 409).

Other valuable resources are available from the Association of State Floodplain Managers, Inc., under its No Adverse Impact initiative ([www.floods.org](http://www.floods.org)).

#### **D. STREAM RESTORATION**

Many localities, the US Army Corps of Engineers, Federal and State Departments of Transportation, and the USDA Natural Resource Conservation Service are involved in stream restoration projects for various reasons including wetland mitigation, stream corridor stabilization, and open space planning implementation.

Floodplain management practices can serve the dual purpose of protecting the natural functions of the stream systems in your community and also protecting the quality of the water they provide. A stream system is comprised of the stream and its drainage basins. The system serves the very important natural functions of conveying storm water and groundwater, storing floodwater, and supporting aquatic and other life.

Communities can protect the natural functions of stream systems by establishing a stream buffer network—vegetated lands adjacent to the stream channel in the drainage basin, which serve as a buffer to protect the stream system's ability to fulfill its natural functions. Primary natural functions of the buffer include:

- Protecting water quality by filtering pollutants
- Providing storage for floodwaters
- Allowing channels to meander naturally
- Providing suitable habitats for wildlife

Vegetated buffer zones allow storm water to flow in a diffuse manner, instead of in channels. This gives the runoff time to slowly pass through the ground cover and filter out pollutants. Dense, vigorous vegetation also protects the soil from raindrop impact, a major force in dislodging soil particles and moving them down slope. Plants also reduce the moisture content of the soil through transpiration, thus increasing its capacity to absorb water. Large trees and carefully designed buffers may dramatically increase property value.

A healthy vegetative cover within the buffer can provide:

- a stable land surface to absorb rainfall;
- a tree canopy to shade surface waters and lower water temperatures (thus improving aquatic habitats); and
- a dense root mass to hold soil, improve its physical condition, and absorb pollutants washing across the land.

## 5.2 PROGRAMS FOR MITIGATING FLOOD HAZARDS AND THEIR RISKS

### A. FLOOD MITIGATION ASSISTANCE

#### Overview

FEMA's Flood Mitigation Assistance Program (FMA) is a pre-disaster grant program. It provides funding to assist states and communities in implementing measures to reduce or eliminate the long-term risk of flood damage to buildings, manufactured homes, and other structures insurable under the National Flood Insurance Program (NFIP).

Planning is the foundation of FMA. FEMA encourages communities to identify ways to reduce their risk of flood damage by preparing flood mitigation plans. These plans must assess flood risk and identify action to reduce that risk.

Once a community has developed a flood mitigation plan, the next step is to request approval of that plan from the state point of contact (POC) for FMA and also from FEMA. Approved plans make a community eligible to apply for FMA project grants. Plans must assess flood risk and identify actions to reduce that risk.

#### Types of FMA Grants

There are two types of FMA grants that are available to communities:

- Planning grants. Awarded to states and communities to develop or update flood mitigation plans. Planning is the foundation of FMA. With an approved plan, a community becomes eligible to apply for FMA project grants. Plans must assess the flood risk and identify actions to reduce the risk.
- Project grants. Awarded to states and communities to implement measures to reduce flood losses. To be eligible, projects must reduce the risk of flood damage to structures insurable under the NFIP.

#### Eligible Projects

Projects that reduce the risk of flood damage to structures insurable under the NFIP are eligible. Such activities include:

- acquisition of insured structures and real property;
- relocation or demolition of insured structures;
- elevation of insured structures;
- dry flood-proofing of insured structures;
- minor, localized structural projects that are not funded by state or other federal programs; and
- beach nourishment activities.

#### Eligible Applicants

Any state agency, participating NFIP community, or qualified local organization is eligible to participate in FMA. Communities that are suspended or on probation from the NFIP are not eligible. Individuals wishing to participate in FMA should contact their community officials.

#### Standards for Project Grant Eligibility

A project must, at a minimum, be:

- cost effective;
- beneficial in cost to the NFIP;
- technically feasible;
- physically located in a participating NFIP community, or must reduce future flood damages in an NFIP community; and
- conform with (1) minimum standards of the NFIP floodplain management regulations; (2) applicant's flood mitigation plan; and (3) all applicable laws and regulations, such as federal and state environmental standards or local building codes.

### **The FMA Grant Process**

FEMA distributes FMA funds to states, which in turn provide funds to communities. The state serves as the grantee and program administrator for the FMA. The state's responsibilities follow:

- sets mitigation priorities;
- provides technical assistance to communities applying for FMA funds;
- evaluates grant applications based on minimum eligibility criteria and state priorities;
- awards planning grants;
- works with FEMA to approve projects and awards funds to communities; and
- ensures that all community applicants are aware of their grant management responsibilities.

### **Funding and Cost-Sharing**

Basic FMA funds are made available from amounts collected by the NFIP through the sales of flood insurance. Each year funding is set aside for Basic FMA activities across the nation: planning grants, project grants, and technical assistance grants. While funding was limited to \$20 million per year through FY04, the authorization was increased to \$40 million by the Bunning-Beureter-Blumenauer Flood Insurance Reform Act of 2004.

Basic FMA funds are allocated to the states based on a number of criteria established by FEMA, including the number of repetitive loss properties and number of insurance policies.

The Basic FMA program provides up to 75% of eligible costs of projects that meet the eligibility criteria. When the 2004 amendments to the program are implemented, funding may be available for up to 90% if the State's mitigation plan has been approved by FEMA as having specific provisions intended to reduce the number of "severe repetitive loss properties".

In addition to CDBG and local or State funds, the non-federal match may include property owner funds or a portion of flood insurance claim payments. Some matching funds may be "in-kind" contributions.

### **FMA Pilot Program**

Sometime in FY05 or FY06, a "Pilot Program" will be initiated as a component of the Flood Mitigation Assistance program. Also authorized to be funded at \$40 million per year, the Pilot Program will be limited to certain "severe repetitive loss properties" as defined in the statute. These properties are those that have received 4 or more federal flood insurance claims that each exceed \$5,000 or properties that have received at least 2 claims that exceed the value of the property. Contact the State Hazard Mitigation Officer to learn more as this program develops.

## **B. HAZARD MITIGATION GRANT PROGRAM**

### **Overview**

The Hazard Mitigation Grant Program (HMGP) is a post-disaster grant program. It assists states and local communities in implementing long-term hazard mitigation measures following a major disaster declared by the president. Federal funding under the HMGP provides up to 75 percent of the total eligible costs for such projects.

### **Program Objectives**

The objectives of the HMGP follow:

- prevent future losses of lives and property due to disasters;
- implement state or local hazard mitigation plans;
- enable implementation of mitigation measures during immediate recovery from a disaster; and
- provide funding for previously identified mitigation measures that benefit the disaster area.

### **Applicant Eligibility**

Applicant eligibility is the same for the HMGP as it is for FEMA's Public Assistance Program, which provides federal funds to political subdivisions, like cities and counties, for damages resulting from a presidentially declared disaster. Applicants who are eligible for the HMGP include:

- state and local governments;
- certain private nonprofit organizations or institutions; and
- Indian tribes or authorized tribal organizations and Alaska native villages or organizations.

### **Project Eligibility**

The HMGP can be used to fund projects to protect either public or private property. Examples of projects include:

- acquisition and relocation of structures from hazard-prone areas;
- retrofitting, such as floodproofing to protect structures from future damage;
- development of state or local standards to protect new and substantially improved structures from disaster damage; and
- structural hazard control, such as debris basins or floodwalls.

### **Grant Application Process**

Eligible applicants must apply for the HMGP through the state, since the state is responsible for administering the program. You should contact the state hazard mitigation officer for specific details. In Virginia, that office is located in the Department of Emergency Management (see contact information at the end of this chapter). Every state must develop a Hazard Mitigation Administrative Plan that explains the state's procedures for administering the HMGP.

The state must submit a letter of intent to FEMA to participate in the HMGP within 60 days of the disaster declaration. Applications for mitigation projects are encouraged as soon as possible after the disaster occurs, so that opportunities to initiate mitigation are

not lost during reconstruction. All new project proposals must be submitted for approval within 90 days after FEMA approves the state's hazard mitigation plan for the disaster. You should contact your state hazard mitigation officer for specific application dates.

FEMA can fund up to 75 percent of the eligible costs of each project. The state or local match does not need to be cash; it can be in-kind services or materials. The HMGP is now based on 15 percent of the federal funds spent on each disaster.

### **Project Selection**

The state's administrative plan governs how projects are selected for funding. However, proposed projects must meet certain minimum criteria. These criteria are designed to ensure that the most cost-effective and appropriate projects are selected for funding. Both the law and the regulations require that the projects be part of an overall mitigation strategy for the disaster area.

### **HMGP Versus Disaster Public Assistance**

Mitigation projects may also be identified and funded through FEMA's Public Assistance Program after a disaster declaration. Public Assistance funds allow an existing damaged facility to incorporate mitigation measures during repairs, if the measures are cost-effective, or if they are required by code. These potential measures can be identified by either FEMA, the state, or the local applicant.

Mitigation funded under Public Assistance is only for public facilities damaged by the disaster. The HMGP can fund mitigation measures to protect public or private property, so long as these measures fit within the overall mitigation strategy for the disaster area, and they comply with program guidelines. For public property damaged in the disaster, it is more appropriate to fund mitigation measures under Section 406 before applying to the HMGP.

More Information on HMGP Regulations for the HMGP are published in Title 44 of the Code of Federal Regulations, Part 206, Subpart N. Detailed information about applying for and managing the program can be found in FEMA's Hazard Mitigation Grant Program Desk Reference.

For further information, contact your state hazard mitigation officer:

State Hazard Mitigation Officer  
Department of Emergency Management  
10501 Trade Court  
Richmond, VA 23236  
Phone: (804) 897-8500

### **C. PRE-DISASTER MITIGATION**

#### **Overview**

In 2003, FEMA initiated the nationwide, competitive Pre-Disaster Mitigation (PDM) grant program. For the most part, eligible applicants, project eligibility, and administrative mechanisms will be substantially similar to the HMGP. A mitigation plan that has been approved by MEMA and FEMA must be prepared in conformance with specific criteria. Contact the State Hazard Mitigation Officer for assistance.

#### **Differences in Mitigation Programs**

FEMA and MEMA will notify communities regarding details when funds are made available. The most significant differences between PDM, HMGP, and FMA include:

- PDM is expected to be supported by an annual appropriations (as opposed to depend on disaster declarations);
- Competition will be nationwide;
- Projects that address different hazards will compete;
- Heavy emphasis will be placed on the most cost-beneficial projects; and
- Certain limitations may be imposed, including the number of projects from each state and the maximum grant amount.

### **5.3 OTHER RESOURCES FOR EDUCATION IN FLOODPLAIN MANAGEMENT ADMINISTRATION**

#### **A. FEMA'S EMERGENCY MANAGEMENT INSTITUTE**

The National Emergency Training Center (NETC) in Emmitsburg, Maryland, offers the finest in educational resources. The campus is located 12 miles south of Gettysburg, Pennsylvania, 75 miles north of Washington, DC, and 50 miles northwest of Baltimore, Maryland.

The 107-acre campus is shared by the United States Fire Administration (USFA), the National Fire Academy (NFA), the Emergency Management Institute (EMI), the Field Personnel Operations Division, and the Satellite Procurement Office. The campus has fully equipped air-conditioned classrooms, lodging for students, a Learning Resource Center, and dining and recreational facilities. There also are several specialized facilities, such as the Simulation and Exercise Lab, a television studio (EENET), and two computer laboratories that are integral to the instruction of many courses.

Through its courses and programs, EMI serves as the national focal point for the development and delivery of emergency management training to enhance the capabilities of Federal, State, local, and Tribal government officials, volunteer organizations, and the public and private sectors to minimize the impact of disasters on the American public. EMI curricula are structured to meet the needs of this diverse audience with an emphasis on how the various elements work together in emergencies to save lives and protect property.

Instruction focuses on the four phases of emergency management: mitigation, preparedness, response, and recovery. EMI develops courses and administers resident and non-resident training programs in areas such as natural hazards (earthquakes, hurricanes,

floods, dam safety), technological hazards (hazardous materials, terrorism, radiological incidents, chemical stockpile emergency preparedness), professional development, leadership, instructional methodology, exercise design and evaluation, information technology, public information, integrated emergency management, and Train-the-Trainer.

Approximately 5,500 participants attend resident courses each year while 100,000 individuals participate in non-resident programs sponsored by EMI and conducted by State emergency management agencies under cooperative agreements with FEMA. Another 150,000 individuals participate in EMI-supported exercises, and approximately 1,000 individuals participate in the Chemical Stockpile Emergency Preparedness Program (CSEPP). Additionally, hundreds of thousands of individuals use EMI distance learning programs such as the Independent Study Program and the Emergency Education NETWORK (EENET) in their home communities. Visit the EMI Web site at: <http://www.fema.gov/emi>.

## **B. ASSOCIATION OF STATE FLOODPLAIN MANAGERS**

The Association of State Floodplain Managers supports comprehensive nonstructural and structural management of the nation's floodplains and related water resources. The ASFPM believes that, through coordinated, well-informed efforts, the public and private sectors can:

- reduce loss of human life and property damage resulting from flooding
- preserve the natural and cultural values of floodplains, and
- avoid actions that exacerbate flooding.

To help reach these goals, the ASFPM fosters communication among those responsible for flood hazard activities, provides technical advice to governments and other entities about proposed actions or policies that will affect flood hazards, and

encourages flood hazard research, education and training.

The purpose of the Association is to provide a means of state and local representation on a national basis regarding policies and activities dealing with floodplain management and to advance the study, research and exchange of information on the technical aspects of floodplain management as a means of reducing flood damage within the United States

## **C. CERTIFIED FLOODPLAIN MANAGER PROGRAM**

The Certified Floodplain Manager Program was established by the Association of State Floodplain Managers (ASFPM) in 1999. The emphasis of the Program is on knowing the fundamentals of flood mapping, managing floodplain development, national and state standards, and how to apply them to a locally administered program. CFMs® have been defined as people "who know their stuff."

To become a CFM®, a person should study the basics of floodplain management. These are found in courses conducted by FEMA, the states and ASFPM. The best single reference is the course material used for FEMA's course Managing Floodplain Development Through the National Flood Insurance Program (FEMA IS-9), which can be downloaded through a link on the ASFPM website ([www.floods.org](http://www.floods.org)).

When a person is ready, he or she applies to take the exam, which is offered many times throughout the year at locations around the country, often in conjunction with a state training program or conference which prepares the person for the exam. The exam is three hours long and covers the gamut of topics that a local administrator needs to know. Application forms are available on the ASFPM website ([www.floods.org](http://www.floods.org)).

In order for a Certified Floodplain Manager to continue to effectively serve his or her community, continuing

education is necessary. Credits for this continuing education can be obtained by attending training, workshops/technical conferences or by completing graded home study courses. CECs can also be obtained through web based training courses offered by our Partner, RedVector.com® ASFPM Members receive a discount when they link to RedVector.com® through the ASFPM website and use the ASFPM reference code. CFMs® must provide verification for completing continuing education during each two year renewal period, thus demonstrating their continuing competency in handling their community's floodplain program.

As of January 1, 2005 the CFM® Program boasts over 1500 certified professionals nationwide. Employers of these CFMs® are now reaping the rewards of having staff that "know their stuff". Some communities have received additional credit under the NFIP Community Rating System. Other communities report they have less trouble with the construction industry because the staff is able to clearly explain the process and requirements of the local floodplain ordinance.

#### **D. VIRGINIA FLOODPLAIN MANAGEMENT ASSOCIATION**

The Virginia Floodplain Management Association (VFMA) is a group of professionals representing state and federal agencies, local government officials and private firms dedicated to expanding the application of proactive floodplain management in the Commonwealth of Virginia. VFMA provides easy access to information about state and federal guidelines and regulations and funding assistance to plan for avoiding flooding or for flood mitigation, response and recovery. By newsletters, a discussion group associated with this web page or by workshops offered around the state, the VFMA is the one centralized location to learn what other communities are doing, to keep pace with technology and to participate with others in the profession.

The Virginia Floodplain Management Association (VFMA) was created to serve the floodplain management community. In 1994, VFMA held their first conference in Williamsburg, Virginia. Similar annual gatherings have been held since then as part of the Virginia Water Conference which is hosted by the Virginia Lakes and Watersheds Conference. VFMA has published a semi-annual newsletter, Virginia Currents, that is distributed free of charge to every municipal government in the state participating in the Federal Emergency Management Agency's (FEMA) National Flood Insurance Program (NFIP).

VFMA typically sponsors two to three regional workshops around the Commonwealth along with an annual meeting at the Virginia Water Conference to present relevant information to those interested in proactive floodplain management. The one to two-day regional workshops typically have 30 to 60 participants and cover topics to assist local floodplain administrators do their jobs more effectively whether it is to implement new regulations, to apply new technologies or to train the private sector on how to prepare and submit floodplain information for review. The two-day annual meeting is an opportunity to listen to presentations from experts in the field as well as success stories from communities around the country.

Additional information on the Association and its activities along with an application form are available on its web site at [www.vaflood.org](http://www.vaflood.org).

# **APPENDIX A**

## **GLOSSARY OF NFIP TERMINOLOGY**

# NFIP DEFINITIONS FOR FLOODPLAIN ADMINISTRATORS

(Reference: 44 CFR 59.1, 10-1-03 Edition)

If you are involved with administering a local floodplain ordinance, there are some definitions and terms associated with the National Flood Insurance Program (NFIP) that you should be familiar with. The following NFIP definitions are contained in the NFIP Regulations, 44 CFR, Section 59.1, and are subject to change. The terms that are not in parenthesis but are in bold print are additional terms taken from FEMA publications.

“Alluvial fan flooding” means flooding occurring on the surface of an alluvial fan or similar landform which originates at the apex and is characterized by high-velocity flows; active processes of erosion, sediment transport, and deposition; and, unpredictable flow paths.

“Apex” means a point on an alluvial fan or similar landform below which the flow path of the major stream that formed the fan becomes unpredictable and alluvial fan flooding can occur.

“Applicant” means a community which indicates a desire to participate in the Program.

“Appurtenant structure” means a structure which is on the same parcel of property as the principal structure to be insured and the use of which is incidental to the use of the principal structure.

“Area of future-conditions flood hazard” means the land area that would be inundated by the 1-percent-annual-chance (100-year) flood based on future-conditions hydrology.

“Area of shallow flooding” means a designated AO, AH, AR/AO, AR/AH, or VO zone on a community's Flood Insurance Rate Map (FIRM) with a 1 percent or greater annual chance of flooding to an average depth of 1 to 3 feet where a clearly defined channel does not exist, where the path of flooding is unpredictable, and where velocity flow may be evident. Such flooding is characterized by ponding or sheet flow.

“Area of special flood-related erosion hazard” is the land within a community which is most likely to be subject to severe flood-related erosion losses. The area may be designated as Zone E on the Flood Hazard Boundary Map (FHBM). After the detailed evaluation of the special flood-related erosion hazard area in preparation for publication of the FIRM, Zone E may be further refined.

“Area of special flood hazard” is the land in the flood plain within a community subject to a 1 percent or greater chance of flooding in any given year. The area may be designated as Zone A on the FHBM. After detailed ratemaking has been completed in preparation for publication of the flood insurance rate map, Zone A usually is refined into Zones A, AO, AH, A1-30, AE, A99, AR, AR/A1-30, AR/AE, AR/AO, AR/AH, AR/A, VO, or V1-30, VE, or V. For purposes of these regulations, the term “special flood hazard area” is synonymous in meaning with the phrase “area of special flood hazard”.

“Area of special mudslide (i.e., mudflow) hazard” is the land within a community most likely to be subject to severe mudslides (i.e., mudflows). The area may be designated as Zone M on the

FHBM. After the detailed evaluation of the special mudslide (i.e., mudflow) hazard area in preparation for publication of the FIRM, Zone M may be further refined.

“Base flood” means the flood having a one percent chance of being equalled or exceeded in any given year.

“Basement” means any area of the building having its floor subgrade (below ground level) on all sides.

“Breakaway wall” means a wall that is not part of the structural support of the building and is intended through its design and construction to collapse under specific lateral loading forces, without causing damage to the elevated portion of the building or supporting foundation system.

“Building” - see structure.

“Chargeable rates” mean the rates established by the Administrator pursuant to section 1308 of the Act for first layer limits of flood insurance on existing structures.

“Chief Executive Officer of the community (CEO)” means the official of the community who is charged with the authority to implement and administer laws, ordinances and regulations for that community.

“Coastal high hazard area” means an area of special flood hazard extending from offshore to the inland limit of a primary frontal dune along an open coast and any other area subject to high velocity wave action from storms or seismic sources.

“Community” means any State or area or political subdivision thereof, or any Indian tribe or authorized tribal organization, or Alaska Native village or authorized native organization, which has authority to adopt and enforce flood plain management regulations for the areas within its jurisdiction.

“Contents coverage” is the insurance on personal property within an enclosed structure, including the cost of debris removal, and the reasonable cost of removal of contents to minimize damage. Personal property may be household goods usual or incidental to residential occupancy, or merchandise, furniture, fixtures, machinery, equipment and supplies usual to other than residential occupancies.

“Criteria” means the comprehensive criteria for land management and use for flood-prone areas developed under 42 U.S.C. 4102 for the purposes set forth in part 60 of this subchapter.

“Critical feature” means an integral and readily identifiable part of a flood protection system, without which the flood protection provided by the entire system would be compromised.

“Curvilinear Line” means the border on either a FHBM or FIRM that delineates the special flood, mudslide (i.e., mudflow) and/or flood-related erosion hazard areas and consists of a curved or contour line that follows the topography.

“Deductible” means the fixed amount or percentage of any loss covered by insurance which is borne by the insured prior to the insurer's liability.

“Developed area” means an area of a community that is:

- (a) A primarily urbanized, built-up area that is a minimum of 20 contiguous acres, has basic urban infrastructure, including roads, utilities, communications, and public facilities, to sustain industrial, residential, and commercial activities, and
  - (1) Within which 75 percent or more of the parcels, tracts, or lots contain commercial, industrial, or residential structures or uses; or
  - (2) Is a single parcel, tract, or lot in which 75 percent of the area contains existing commercial or industrial structures or uses; or
  - (3) Is a subdivision developed at a density of at least two residential structures per acre within which 75 percent or more of the lots contain existing residential structures at the time the designation is adopted.
- (b) Undeveloped parcels, tracts, or lots, the combination of which is less than 20 acres and contiguous on at least 3 sides to areas meeting the criteria of paragraph (a) at the time the designation is adopted.
- (c) A subdivision that is a minimum of 20 contiguous acres that has obtained all necessary government approvals, provided that the actual “start of construction” of structures has occurred on at least 10 percent of the lots or remaining lots of a subdivision or 10 percent of the maximum building coverage or remaining building coverage allowed for a single lot subdivision at the time the designation is adopted and construction of structures is underway. Residential subdivisions must meet the density criteria in paragraph (a)(3).

“Development” means any man-made change to improved or unimproved real estate, including but not limited to buildings or other structures, mining, dredging, filling, grading, paving, excavation or drilling operations or storage of equipment or materials.

“Director” means the Director of the Federal Emergency Management Agency.

“Eligible community or participating community” means a community for which the Administrator has authorized the sale of flood insurance under the National Flood Insurance Program.

“Elevated building” means, for insurance purposes, a non-basement building which has its lowest elevated floor raised above ground level by foundation walls, shear walls, posts, piers, pilings, or columns.

“Emergency Flood Insurance Program or emergency program” means the Program as implemented on an emergency basis in accordance with section 1336 of the Act. It is intended as a program to provide a first layer amount of insurance on all insurable structures before the effective date of the initial FIRM.

**Encroachment:** Development in a floodplain restricts the use of natural overflow areas that are needed when streams swell over their banks during flooding. Each development encroaches on the natural overflow area of the stream and increases the base-flood elevation. Development of floodplains is therefore called *encroachment*.

“Erosion” means the process of the gradual wearing away of land masses. This peril is not per se covered under the Program.

“Exception” means a waiver from the provisions of part 60 of this subchapter directed to a community which relieves it from the requirements of a rule, regulation, order or other determination made or issued pursuant to the Act.

“Existing construction” means for the purposes of determining rates, structures for which the “start of construction” commenced before the effective date of the FIRM or before January 1, 1975, for FIRMs effective before that date.

“Existing construction” may also be referred to as “existing structures.”

“Existing manufactured home park or subdivision” means a manufactured home park or subdivision for which the construction of facilities for servicing the lots on which the manufactured homes are to be affixed (including, at a minimum, the installation of utilities, the construction of streets, and either final site grading or the pouring of concrete pads) is completed before the effective date of the floodplain management regulations adopted by a community.

“Existing structures” - see existing construction.

“Expansion to an existing manufactured home park or subdivision” means the preparation of additional sites by the construction of facilities for servicing the lots on which the manufacturing homes are to be affixed (including the installation of utilities, the construction of streets, and either final site grading or the pouring of concrete pads).

“Federal agency” means any department, agency, corporation, or other entity or instrumentality of the executive branch of the Federal Government, and includes the Federal National Mortgage Association and the Federal Home Loan Mortgage Corporation.

**Federal Emergency Management Agency (FEMA):** FEMA is the agency within the Department of Homeland Security that has overall responsibility for administration of the NFIP, flood hazard mapping, response and recovery efforts for federally declared disasters, and all hazards mitigation planning and project administration.

“Federal instrumentality responsible for the supervision, approval, regulation, or insuring of banks, savings and loan associations, or similar institutions” means the Board of Governors of the Federal Reserve System, the Federal Deposit Insurance Corporation, the Comptroller of the Currency, the Federal Home Loan Bank Board, the Federal Savings and Loan Insurance Corporation, and the National Credit Union Administration.

**Federal Insurance and Mitigation Administration (FIMA):** The federal office located within FEMA that has specific responsibility for administering the NFIP, flood hazard mapping, and hazard mitigation planning and project administration.

“Financial assistance” means any form of loan, grant, guaranty, insurance, payment, rebate, subsidy, disaster assistance loan or grant, or any other form of direct or indirect Federal assistance, other than general or special revenue sharing or formula grants made to States.

“Financial assistance for acquisition or construction purposes” means any form of financial assistance which is intended in whole or in part for the acquisition, construction, reconstruction, repair, or improvement of any publicly or privately owned building or mobile

home, and for any machinery, equipment, fixtures, and furnishings contained or to be contained therein, and shall include the purchase or subsidization of mortgages or mortgage loans but shall exclude assistance pursuant to the Disaster Relief Act of 1974 other than assistance under such Act in connection with a flood. It includes only financial assistance insurable under the Standard Flood Insurance Policy.

“First-layer coverage” is the maximum amount of structural and contents insurance coverage available under the Emergency Program.

“Flood” or “Flooding” means:

- (a) A general and temporary condition of partial or complete inundation of normally dry land areas from:
  - (1) The overflow of inland or tidal waters.
  - (2) The unusual and rapid accumulation or runoff of surface waters from any source.
  - (3) Mudslides (i.e., mudflows) which are proximately caused by flooding as defined in paragraph (a)(2) of this definition and are akin to a river of liquid and flowing mud on the surfaces of normally dry land areas, as when earth is carried by a current of water and deposited along the path of the current.
- (b) The collapse or subsidence of land along the shore of a lake or other body of water as a result of erosion or undermining caused by waves or currents of water exceeding anticipated cyclical levels or suddenly caused by an unusually high water level in a natural body of water, accompanied by a severe storm, or by an unanticipated force of nature, such as flash flood or an abnormal tidal surge, or by some similarly unusual and unforeseeable event which results in flooding as defined in paragraph (a)(1) of this definition.

“Flood elevation determination” means a determination by the Administrator of the water surface elevations of the base flood, that is, the flood level that has a one percent or greater chance of occurrence in any given year.

“Flood elevation study” means an examination, evaluation and determination of flood hazards and, if appropriate, corresponding water surface elevations, or an examination, evaluation and determination of mudslide (i.e., mudflow) and/or flood-related erosion hazards.

**Flood frequency:** This term refers to the probability of a flood of a certain magnitude occurring in a given year. For example a 100-year flood has the probability of reaching a certain elevation once in 100 years, or it has a 1 percent chance of occurring in any given year. It is important to note that flood frequency is a *probability*. For this reason, it is possible for a, 100-year flood to occur three or more years in a row, or not at all for 500 years.

**Flood fringe:** The area in the floodplain outside of the floodway is called the flood fringe. It is the area of the floodplain that can be developed without causing substantial increase (more than 1 foot) in the base-flood elevation.

“Flood Hazard Boundary Map (FHBM)” means an official map of a community, issued by the Administrator, where the boundaries of the flood, mudslide (i.e., mudflow) related erosion areas having special hazards have been designated as Zones A, M, and/or E.

“Flood insurance” means the insurance coverage provided under the Program.

“Flood Insurance Rate Map (FIRM)” means an official map of a community, on which the Administrator has delineated both the special hazard areas and the risk premium zones applicable to the community.

“Flood Insurance Study” - see flood elevation study.

**Flood insurance study (FIS):** The FIS is the official report prepared by the Federal Insurance Administration that contains the flood profile, base-flood water surface elevations, and a flood boundary or floodway map for floodplain regulation purposes.

“Flood plain or flood-prone area” means any land area susceptible to being inundated by water from any source (see definition of “flooding”).

“Flood plain management” means the operation of an overall program of corrective and preventive measures for reducing flood damage, including but not limited to emergency preparedness plans, flood control works and flood plain management regulations.

“Flood plain management regulations” means zoning ordinances, subdivision regulations, building codes, health regulations, special purpose ordinances (such as a flood plain ordinance, grading ordinance and erosion control ordinance) and other applications of police power. The term describes such state or local regulations, in any combination thereof, which provide standards for the purpose of flood damage prevention and reduction.

**Flood profile:** A flood profile is a graph that shows the relationship of the water surface elevation of a flood event to locations along a river or stream.

“Flood protection system” means those physical structural works for which funds have been authorized, appropriated, and expended and which have been constructed specifically to modify flooding in order to reduce the extent of the area within a community subject to a “special flood hazard” and the extent of the depths of associated flooding. Such a system typically includes hurricane tidal barriers, dams, reservoirs, levees or dikes. These specialized flood modifying works are those constructed in conformance with sound engineering standards.

“Flood proofing” means any combination of structural and non-structural additions, changes, or adjustments to structures which reduce or eliminate flood damage to real estate or improved real property, water and sanitary facilities, structures and their contents.

“Flood-related erosion” means the collapse or subsidence of land along the shore of a lake or other body of water as a result of undermining caused by waves or currents of water exceeding anticipated cyclical levels or suddenly caused by an unusually high water level in a natural body of water, accompanied by a severe storm, or by an unanticipated force of nature, such as a flash flood or an abnormal tidal surge, or by some similarly unusual and unforeseeable event which results in flooding.

“Flood-related erosion area or flood-related erosion prone area” means a land area adjoining the shore of a lake or other body of water, which due to the composition of the shoreline or bank and high water levels or wind-driven currents, is likely to suffer flood-related erosion damage.

“Flood-related erosion area management” means the operation of an overall program of corrective and preventive measures for reducing flood-related erosion damage, including but not limited to emergency preparedness plans, flood-related erosion control works, and flood plain management regulations.

“Floodway” - see regulatory floodway.

“Floodway encroachment lines” mean the lines marking the limits of floodways on Federal, State and local flood plain maps.

“Freeboard” means a factor of safety usually expressed in feet above a flood level for purposes of flood plain management.

“Freeboard” tends to compensate for the many unknown factors that could contribute to flood heights greater than the height calculated for a selected size flood and floodway conditions, such as wave action, bridge openings, and the hydrological effect of urbanization of the watershed.

“Functionally dependent use” means a use which cannot perform its intended purpose unless it is located or carried out in close proximity to water. The term includes only docking facilities, port facilities that are necessary for the loading and unloading of cargo or passengers, and ship building and ship repair facilities, but does not include long-term storage or related manufacturing facilities.

“Future-conditions flood hazard area, or future-conditions floodplain”--see Area of future-conditions flood hazard.

“Future-conditions hydrology” means the flood discharges associated with projected land-use conditions based on a community's zoning maps and/or comprehensive land-use plans and without consideration of projected future construction of flood detention structures or projected future hydraulic modifications within a stream or other waterway, such as bridge and culvert construction, fill, and excavation.

“General Counsel” means the General Counsel of the Federal Emergency Management Agency.

“Highest adjacent grade” means the highest natural elevation of the ground surface prior to construction next to the proposed walls of a structure.

“Historic Structure” means any structure that is:

- (a) Listed individually in the National Register of Historic Places (a listing maintained by the Department of Interior) or preliminarily determined by the Secretary of the Interior as meeting the requirements for individual listing on the National Register;
- (b) Certified or preliminarily determined by the Secretary of the Interior as contributing to the historical significance of a registered historic district or a district preliminarily determined by the Secretary to qualify as a registered historic district;
- (c) Individually listed on a state inventory of historic places in states with historic preservation programs which have been approved by the Secretary of the Interior; or
- (d) Individually listed on a local inventory of historic places in communities with historic preservation programs that have been certified either:
  - (1) By an approved state program as determined by the Secretary of the Interior or

(2) Directly by the Secretary of the Interior in states without approved programs.

“Independent scientific body” means a non-Federal technical or scientific organization involved in the study of land use planning, flood plain management, hydrology, geology, geography, or any other related field of study concerned with flooding.

“Insurance adjustment organization” means any organization or person engaged in the business of adjusting loss claims arising under the Standard Flood Insurance Policy.

“Insurance company or insurer” means any person or organization authorized to engage in the insurance business under the laws of any State.

“Levee” means a man-made structure, usually an earthen embankment, designed and constructed in accordance with sound engineering practices to contain, control, or divert the flow of water so as to provide protection from temporary flooding.

“Levee System” means a flood protection system which consists of a levee, or levees, and associated structures, such as closure and drainage devices, which are constructed and operated in accordance with sound engineering practices.

“Lowest Floor” means the lowest floor of the lowest enclosed area (including basement). An unfinished or flood resistant enclosure, usable solely for parking of vehicles, building access or storage in an area other than a basement area is not considered a building's lowest floor; provided, that such enclosure is not built so as to render the structure in violation of the applicable non-elevation design requirements of Sec. 60.3.

“Mangrove stand” means an assemblage of mangrove trees which are mostly low trees noted for a copious development of interlacing adventitious roots above the ground and which contain one or more of the following species: Black mangrove (*Avicennia Nitida*); red mangrove (*Rhizophora Mangle*); white mangrove (*Languncularia Racemosa*); and buttonwood (*Conocarpus Erecta*).

“Manufactured home” means a structure, transportable in one or more sections, which is built on a permanent chassis and is designed for use with or without a permanent foundation when attached to the required utilities. The term “manufactured home” does not include a “recreational vehicle”.

“Manufactured home park or subdivision” means a parcel (or contiguous parcels) of land divided into two or more manufactured home lots for rent or sale.

“Map” means the Flood Hazard Boundary Map (FHBM) or the Flood Insurance Rate Map (FIRM) for a community issued by the Agency.

“Mean sea level” means, for purposes of the National Flood Insurance Program, the National Geodetic Vertical Datum (NGVD) of 1929 or other datum, to which base flood elevations shown on a community's Flood Insurance Rate Map are referenced.

“Mudslide “(i.e., mudflow) describes a condition where there is a river, flow or inundation of liquid mud down a hillside usually as a result of a dual condition of loss of brush cover, and the subsequent accumulation of water on the ground preceded by a period of unusually heavy or

sustained rain. A mudslide (i.e., mudflow) may occur as a distinct phenomenon while a landslide is in progress, and will be recognized as such by the Administrator only if the mudflow, and not the landslide, is the proximate cause of damage that occurs.

“Mudslide (i.e., mudflow) area management” means the operation of an overall program of corrective and preventive measures for reducing mudslide (i.e., mudflow) damage, including but not limited to emergency preparedness plans, mudslide control works, and flood plain management regulations.

“Mudslide (i.e., mudflow) prone area” means an area with land surfaces and slopes of unconsolidated material where the history, geology and climate indicate a potential for mudflow.

“New construction” means, for the purposes of determining insurance rates, structures for which the “start of construction” commenced on or after the effective date of an initial FIRM or after December 31, 1974, whichever is later, and includes any subsequent improvements to such structures. For floodplain management purposes, new construction means structures for which the start of construction commenced on or after the effective date of a floodplain management regulation adopted by a community and includes any subsequent improvements to such structures.

“New manufactured home park or subdivision” means a manufactured home park or subdivision for which the construction of facilities for servicing the lots on which the manufactured homes are to be affixed (including at a minimum, the installation of utilities, the construction of streets, and either final site grading or the pouring of concrete pads) is completed on or after the effective date of floodplain management regulations adopted by a community.

“100-year flood” - see base flood.

“Participating community”, also known as an eligible community, means a community in which the Administrator has authorized the sale of flood insurance.

“Person” includes any individual or group of individuals, corporation, partnership, association, or any other entity, including State and local governments and agencies.

“Policy” means the Standard Flood Insurance Policy.

“Premium” means the total premium payable by the insured for the coverage or coverages provided under the policy. The calculation of the premium may be based upon either chargeable rates or risk premium rates, or a combination of both.

“Primary frontal dune” means a continuous or nearly continuous mound or ridge of sand with relatively steep seaward and landward slopes immediately landward and adjacent to the beach and subject to erosion and overtopping from high tides and waves during major coastal storms. The inland limit of the primary frontal dune occurs at the point where there is a distinct change from a relatively steep slope to a relatively mild slope.

“Principally above ground” means that at least 51 percent of the actual cash value of the structure, less land value, is above ground.

“Program” means the National Flood Insurance Program authorized by 42 U.S.C. 4001 through 4128.

“Program deficiency” means a defect in a community's flood plain management regulations or administrative procedures that impairs effective implementation of those flood plain management regulations or of the standards in Sec. 60.3, 60.4, 60.5, or 60.6.

“Project cost” means the total financial cost of a flood protection system (including design, land acquisition, construction, fees, overhead, and profits), unless the Federal Insurance Administrator determines a given “cost” not to be a part of such project cost.

“Recreational vehicle” means a vehicle which is:

- (a) Built on a single chassis;
- (b) 400 square feet or less when measured at the largest horizontal projection;
- (c) Designed to be self-propelled or permanently towable by a light duty truck; and
- (d) Designed primarily not for use as a permanent dwelling but as temporary living quarters for recreational, camping, travel, or seasonal use.

“Reference feature” is the receding edge of a bluff or eroding frontal dune, or if such a feature is not present, the normal high-water line or the seaward line of permanent vegetation if a highwater line cannot be identified.

“Regular Program” means the Program authorized by the Act under which risk premium rates are required for the first half of available coverage (also known as “first layer” coverage) for all new construction and substantial improvements started on or after the effective date of the FIRM, or after December 31, 1974, for FIRM's effective on or before that date. All buildings, the construction of which started before the effective date of the FIRM, or before January 1, 1975, for FIRMs effective before that date, are eligible for first layer coverage at either subsidized rates or risk premium rates, whichever are lower. Regardless of date of construction, risk premium rates are always required for the second layer coverage and such coverage is offered only after the Administrator has completed a risk study for the community.

“Regulatory floodway” means the channel of a river or other watercourse and the adjacent land areas that must be reserved in order to discharge the base flood without cumulatively increasing the water surface elevation more than a designated height.

“Remedy a violation” means to bring the structure or other development into compliance with State or local flood plain management regulations, or, if this is not possible, to reduce the impacts of its noncompliance. Ways that impacts may be reduced include protecting the structure or other affected development from flood damages, implementing the enforcement provisions of the ordinance or otherwise deterring future similar violations, or reducing Federal financial exposure with regard to the structure or other development.

“Risk premium rates” mean those rates established by the Administrator pursuant to individual community studies and investigations which are undertaken to provide flood insurance in accordance with section 1307 of the Act and the accepted actuarial principles. “Risk premium rates” include provisions for operating costs and allowances.

“Riverine” means relating to, formed by, or resembling a river (including tributaries), stream, brook, etc.

“Sand dunes” mean naturally occurring accumulations of sand in ridges or mounds landward of the beach.

“Scientifically incorrect”. The methodology(ies) and/or assumptions which have been utilized are inappropriate for the physical processes being evaluated or are otherwise erroneous.

“Second layer coverage” means an additional limit of coverage equal to the amounts made available under the Emergency Program, and made available under the Regular Program.

“Servicing company” means a corporation, partnership, association, or any other organized entity which contracts with the Federal Insurance Administration to service insurance policies under the National Flood Insurance Program for a particular area.

“Sheet flow area”- see area of shallow flooding.

“60-year setback” means a distance equal to 60 times the average annual long term recession rate at a site, measured from the reference feature.

“Special flood hazard area”-- see “area of special flood hazard”.

“Special hazard area” means an area having special flood, mudslide (i.e., mudflow), or flood-related erosion hazards, and shown on an FHBM or FIRM as Zone A, AO, A1-30, AE, AR, AR/A1-30, AR/AE, AR/AO, AR/AH, AR/A, A99, AH, VO, V1-30, VE, V, M, or E.

“Standard Flood Insurance Policy” means the flood insurance policy issued by the Federal Insurance Administrator, or an insurer pursuant to an arrangement with the Administrator pursuant to Federal statutes and regulations.

“Start of Construction” (for other than new construction or substantial improvements under the Coastal Barrier Resources Act (Pub. L. 97-348)), includes substantial improvement, and means the date the building permit was issued, provided the actual start of construction, repair, reconstruction, rehabilitation, addition placement, or other improvement was within 180 days of the permit date. The actual start means either the first placement of permanent construction of a structure on a site, such as the pouring of slab or footings, the installation of piles, the construction of columns, or any work beyond the stage of excavation; or the placement of a manufactured home on a foundation. Permanent construction does not include land preparation, such as clearing, grading and filling; nor does it include the installation of streets and/or walkways; nor does it include excavation for a basement, footings, piers, or foundations or the erection of temporary forms; nor does it include the installation on the property of accessory buildings, such as garages or sheds not occupied as dwelling units or not part of the main structure. For a substantial improvement, the actual start of construction means the first alteration of any wall, ceiling, floor, or other structural part of a building, whether or not that alteration affects the external dimensions of the building.

“State” means any State, the District of Columbia, the territories and possessions of the United States, the Commonwealth of Puerto Rico, and the Trust Territory of the Pacific Islands.

“State coordinating agency” means the agency of the state government, or other office designated by the Governor of the state or by state statute at the request of the Administrator to assist in the implementation of the National Flood Insurance Program in that state.

“Storm cellar” means a space below grade used to accommodate occupants of the structure and emergency supplies as a means of temporary shelter against severe tornado or similar wind storm activity.

“Structure” means, for floodplain management purposes, a walled and roofed building, including a gas or liquid storage tank, that is principally above ground, as well as a manufactured home. Structure, for insurance purposes, means:

- (1) A building with two or more outside rigid walls and a fully secured roof, that is affixed to a permanent site;
- (2) A manufactured home (“a manufactured home,” also known as a mobile home, is a structure: built on a permanent chassis, transported to its site in one or more sections, and affixed to a permanent foundation); or
- (3) A travel trailer without wheels, built on a chassis and affixed to a permanent foundation, that is regulated under the community's floodplain management and building ordinances or laws.

For the latter purpose, “structure” does not mean a recreational vehicle or a park trailer or other similar vehicle, except as described in paragraph (3) of this definition, or a gas or liquid storage tank.

“Subsidized rates” mean the rates established by the Administrator involving in the aggregate a subsidization by the Federal Government.

“Substantial damage” means damage of any origin sustained by a structure whereby the cost of restoring the structure to its before damaged condition would equal or exceed 50 percent of the market value of the structure before the damage occurred.

“Substantial improvement” means any reconstruction, rehabilitation, addition, or other improvement of a structure, the cost of which equals or exceeds 50 percent of the market value of the structure before the “start of construction” of the improvement. This term includes structures which have incurred “substantial damage”, regardless of the actual repair work performed. The term does not, however, include either:

- (1) Any project for improvement of a structure to correct existing violations of state or local health, sanitary, or safety code specifications which have been identified by the local code enforcement official and which are the minimum necessary to assure safe living conditions or
- (2) Any alteration of a “historic structure”, provided that the alteration will not preclude the structure's continued designation as a “historic structure”.

“30-year setback” means a distance equal to 30 times the average annual long term recession rate at a site, measured from the reference feature.

“Technically incorrect”. The methodology(ies) utilized has been erroneously applied due to mathematical or measurement error, changed physical conditions, or insufficient quantity or quality of input data.

“V Zone” - see “coastal high hazard area.”

“Variance” means a grant of relief by a community from the terms of a flood plain management regulation.

“Violation” means the failure of a structure or other development to be fully compliant with the community's flood plain management regulations. A structure or other development without the elevation certificate, other certifications, or other evidence of compliance required in Sec. 60.3(b)(5), (c)(4), (c)(10), (d)(3), (e)(2), (e)(4), or (e)(5) is presumed to be in violation until such time as that documentation is provided.

“Water surface elevation” means the height, in relation to the National Geodetic Vertical Datum (NGVD) of 1929, (or other datum, where specified) of floods of various magnitudes and frequencies in the flood plains of coastal or riverine areas.

**Zone A :** Zone A is found on both FHBMs and FIRMs. Zone-A areas would be flooded by the base flood. These areas may be numbered as AO, AH, A1 to A30, AE, or A. Numbered Zone-A areas indicate a particular area's risk to flooding on FIRMs. As areas are being remapped, the Zone-A areas are being replaced by Zone AE.

“Zone of imminent collapse” means an area subject to erosion adjacent to the shoreline of an ocean, bay, or lake and within a distance equal to 10 feet plus 5 times the average annual long-term erosion rate for the site, measured from the reference feature.

# APPENDIX B

## VIRGINIA'S MODEL FLOODPLAIN MANAGEMENT ORDINANCE

*Note: This is the revised Virginia model ordinance that is compliant with 44 CFR 60.3(c). The model ordinances for other sections of 60.3 are provided on the DCR Floodplain Management Program web page ([www.dcr.virginia.gov/sw/floodpln.htm](http://www.dcr.virginia.gov/sw/floodpln.htm))*

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***Virginia Local Official's Guide to Floodplain Management***

### Explanatory Note

These suggested provisions have been prepared for use by municipalities having to comply with the requirements of Section 60.3(b)\* of the National Flood Insurance Program regulations. Your municipal attorney and engineer should be consulted in preparing the necessary ordinance or ordinances.

In using these provisions, certain things must be understood and kept in mind:

- These provisions cannot be adopted verbatim. Every municipality making use of these provisions will have to make some choices and modifications, depending upon the kinds of flood hazard districts and information contained in its Flood Insurance Study, and the community's own particular circumstances and objectives or policy.
- These provisions alone will not meet all the Flood Insurance Program requirements. They are zoning provisions only, and must be used in combination with other kinds of regulations (i.e., Uniform Statewide Building Code and subdivision regulations) in order to meet all of the Program requirements.
- These provisions are not classical "model" floodplain management regulations. With few exceptions, they have been prepared only with the intention of meeting the minimum requirements of the National Flood Insurance Program. Any municipality that may be interested could do considerably more concerning the regulation of development in flood-prone districts.

More stringent local requirements are encouraged, and would be supported by both the Federal Emergency Management Agency and the Division of Soil and Water Conservation (Department of Conservation and Recreation). The more restrictive local regulations would be recognized as taking precedence over the federal minimum guidelines. The needs, circumstances, and objectives of the municipalities are so diverse that the development of a single ordinance or set of provisions for use by all is literally impossible.

If there are any questions concerning these suggested provisions or concerning the National Flood Insurance Program, the Division of Soil and Water Conservation (Department of Conservation and Recreation) (804) 371-6135 or the Philadelphia Regional Office (215) 931-5514 should be contacted without hesitation.

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*\* Section 60.3(b) details what the community must do after the Federal Insurance Administrator has provided a Flood Insurance Rate Map (FIRM) with A zones but has neither produced water surface elevation data nor identified a floodway or a coastal high hazard area*

**ORDINANCE NO. \_\_\_\_\_**

AN ORDINANCE AMENDING ORDINANCE NO. \_\_\_\_\_, THE ZONING ORDINANCE OF Name of Municipality, VIRGINIA, BY ESTABLISHING FLOODPLAIN DISTRICTS, BY REQUIRING THE ISSUANCE OF PERMITS FOR DEVELOPMENT, AND BY PROVIDING FACTORS AND CONDITIONS FOR VARIANCES TO THE TERMS OF THE ORDINANCES.

BE IT ENACTED AND ORDAINED BY THE Name of Governing Body, Name of Municipality, Virginia, as follows:

**ARTICLE I - GENERAL PROVISIONS**

Section 1.1 - Purpose

The purpose of these provisions is to prevent the loss of life and property, the creation of health and safety hazards, the disruption of commerce and governmental services, the extraordinary and unnecessary expenditure of public funds for flood protection and relief, and the impairment of the tax base by:

- A. Regulating uses, activities, and development which, alone or in combination with other existing or future uses, activities, and development, will cause unacceptable increases in flood heights, velocities, and frequencies.
- B. Restricting or prohibiting certain uses, activities, and development from locating within districts subject to flooding.
- C. Requiring all those uses, activities, and developments that do occur in flood-prone districts to be protected and/or flood-proofed against flooding and flood damage.
- D. Protecting individuals from buying land and structures which are unsuited for intended purposes because of flood hazards.

Section 1.2 - Applicability

These provisions shall apply to all lands within the jurisdiction of Name of Municipality and identified as being in the 100-year floodplain by the Federal Insurance Administration.

Section 1.3 - Compliance and Liability

- A. No land shall hereafter be developed and no structure shall be located, relocated, constructed, reconstructed, enlarged, or structurally altered except in full compliance with the terms and provisions of this ordinance and any other applicable ordinances and regulations which apply to uses within the jurisdiction of this ordinance.
- B. The degree of flood protection sought by the provisions of this ordinance is considered

reasonable for regulatory purposes and is based on acceptable engineering methods of study. Larger floods may occur on rare occasions. Flood heights may be increased by man-made or natural causes, such as ice jams and bridge openings restricted by debris. This ordinance does not imply that districts outside the floodplain district, or that land uses permitted within such district will be free from flooding or flood damages.

- C. This ordinance shall not create liability on the part of Name of Municipality or any officer or employee thereof for any flood damages that result from reliance on this ordinance or any administrative decision lawfully made thereunder.

#### Section 1.4 - Abrogation and Greater Restrictions

This ordinance supersedes any ordinance currently in effect in flood-prone districts. However, any underlying ordinance shall remain in full force and effect to the extent that its provisions are more restrictive than this ordinance.

#### Section 1.5 - Severability

If any section, subsection, paragraph, sentence, clause, or phrase of this ordinance shall be declared invalid for any reason whatever, such decision shall not affect the remaining portions of this ordinance. The remaining portions shall remain in full force and effect; and for this purpose, the provisions of this ordinance are hereby declared to be severable.

### **ARTICLE II - DEFINITIONS**

- A. Base Flood/One-Hundred Year Flood - A flood that, on the average, is likely to occur once every 100 years (i.e., that has a one (1) percent chance of occurring each year, although the flood may occur in any year).
- B. Base Flood Elevation (BFE) - The Federal Emergency Management Agency designated 100 year water surface elevation. (NOTE: ADD "ONE, OR MORE FEET" TO END OF SENTENCE TO OBTAIN A GREATER LEVEL OF FLOOD PROTECTION.)
- C. Basement - Any area of the building having its floor subgrade (below ground level) on all sides.
- D. Board of Zoning Appeals - The board appointed to review appeals made by individuals with regard to decisions of the Zoning Administrator in the interpretation of this ordinance.
- E. Development - Any man-made change to improved or unimproved real estate, including, but not limited to, buildings or other structures, mining, dredging, filling, grading, paving, excavation or drilling operations or storage of equipment or materials.
- F. Floodplain - Any land area susceptible to being inundated by water from any source.
- G. Floodway - The channel of a river or other watercourse and the adjacent land areas that must be reserved in order to discharge the base flood without cumulatively increasing the water surface elevation more than a designated height.

- H. Freeboard - A factor of safety usually expressed in feet above a flood level for purposes of floodplain management.
- I. Lowest Floor - The lowest floor of the lowest enclosed area (including basement).
- J. Recreational Vehicle - A vehicle which is:
  - (a) built on a single chassis;
  - (b) 400 square feet or less when measured at the largest horizontal projection;
  - (c) designed to be self-propelled or permanently towable by a light duty truck; and
  - (d) designed primarily not for use as a permanent dwelling but as temporary living quarters for recreational camping, travel, or seasonal use.
- K. Substantial Damage - Damage of any origin sustained by a structure whereby the cost of restoring the structure to its before damaged condition would equal or exceed 50 percent of the market value of the structure before the damage occurred.
- L. Substantial Improvement - Any reconstruction, rehabilitation, addition, or other improvement of a structure, the cost of which equals or exceeds 50 percent of the market value of the structure before the "start of construction" of the improvement. This term includes structures which have incurred "substantial damage" regardless of the actual repair work performed. The term does not, however, include either: (1) any project for improvement of a structure to correct existing violations of state or local health, sanitary, or safety code specifications which have been identified by the local code enforcement official and which are the minimum necessary to assure safe living conditions or (2) any alteration of a "historic structure", provided that the alteration will not preclude the structures continued designation as a "historic structure".

## **ARTICLE III - ESTABLISHMENT OF ZONING DISTRICTS**

### **Section 3.1 - Description of District**

#### **A. Basis of District**

The floodplain district shall include areas subject to inundation by waters of the one hundred (100)-year flood. The basis for the Approximated Floodplain District shall be the Flood Insurance Rate Map/Flood Hazard Boundary Map prepared by the Federal Emergency Management Agency, Federal Insurance Administration, dated \_\_\_\_\_, as amended. *(NOTE: Those communities that had FIS prepared by the Department of Housing and Urban Development should delete FEMA and add HUD)*

***Note:***

*This section is for use where a floodplain has not been delineated and a Flood Insurance Rate*

*Map / Flood Hazard Boundary Map from FEMA is not available. Replace the above section 3.1.A with the following:*

Currently, no floodplain district has been established by the Federal Emergency Management Agency and a Flood Insurance Rate Map / Flood Hazard Boundary Map is not available for the **Name of Municipality** .

**Note:**

*This section is for use where a floodplain has been delineated but no detailed information concerning flood profiles and elevations is included.*

The Approximated Floodplain District shall be that floodplain area for which no detailed flood profiles or elevations are provided but where a one hundred (100)-year floodplain boundary has been approximated. Such areas are shown as Zone A on the Flood Insurance Rate Map/Flood Hazard Boundary Map. For these areas, the one hundred (100)-year flood elevations and floodway information from federal, state, and other acceptable sources shall be used, when available. Where the specific one hundred (100)-year flood elevation cannot be determined for this area using other sources of data, such as the U. S. Army Corps of Engineers Floodplain Information Reports, U.S. Geological Survey Flood-Prone Quadrangles, etc., then the applicant for the proposed use, development and/or activity shall determine this elevation in accordance with hydrologic and hydraulic engineering techniques. Hydrologic and hydraulic analyses shall be undertaken only by professional engineers or others of demonstrated qualifications, who shall certify that the technical methods used correctly reflect currently-accepted technical concepts. Studies, analyses, computations, etc., shall be submitted in sufficient detail to allow a thorough review by the Name of Municipality .

**B. Overlay Concept**

1. The Floodplain District described above shall be overlays to the existing underlying area as shown on the Official Zoning Ordinance Map, and as such, the provisions for the floodplain district shall serve as a supplement to the underlying district provisions.
2. Any conflict between the provisions or requirements of the Floodplain Districts and those of any underlying district, the more restrictive provisions and/or those pertaining to the floodplain districts shall apply.
3. In the event any provision concerning a Floodplain District is declared inapplicable as a result of any legislative or administrative actions or judicial decision, the basic underlying provisions shall remain applicable.

**Section 3.2 - Official Zoning Map**

The boundaries of the Floodplain District are established as shown on the (Flood Hazard Boundary Map / Flood Insurance Rate Map) which is declared to be a part of this ordinance and which shall be kept on file at the Name of Municipality offices.

**Section 3.3 - District Boundary Changes**

The delineation of any of the Floodplain District may be revised by the Name of Governing Body where natural or man-made changes have occurred and/or where more detailed studies have been conducted or undertaken by the U. S. Army Corps of Engineers or other qualified agency, or an individual documents the need for such change. However, prior to any such change, approval must be obtained from the Federal Insurance Administration.

#### Section 3.4 - Interpretation of District Boundaries

Initial interpretations of the boundaries of the Floodplain District shall be made by the Zoning Officer. Should a dispute arise concerning the boundaries of any of the Districts, the Board of Zoning Appeals shall make the necessary determination. The person questioning or contesting the location of the District boundary shall be given a reasonable opportunity to present his case to the Board and to submit his own technical evidence if he so desires.

### **ARTICLE IV - DISTRICT PROVISIONS**

#### Section 4.1 - General Provisions

##### **A. Permit Requirement**

All uses, activities, and development occurring within any Floodplain District shall be undertaken only upon the issuance of a zoning permit. Such development shall be undertaken only in strict compliance with the provisions of the Ordinance and with all other applicable codes and ordinances, such as the Virginia Uniform Statewide Building Code and the Name of Municipality Subdivision Regulations. Prior to the issuance of any such permit, the Zoning Officer shall require all applications to include compliance with all applicable state and federal laws. Under no circumstances shall any use, activity, and/or development adversely affect the capacity of the channels or floodway of any watercourse, drainage ditch, or any other drainage facility or system.

##### **B. Alteration or Relocation of Watercourse**

Prior to any proposed alteration or relocation of any channels or of any watercourse, stream, etc., within this jurisdiction a permit shall be obtained from the U. S. Corps of Engineers, the Virginia Department of Environmental Quality, and the Virginia Marine Resources Commission (a joint permit application is available from any of these organizations). Further notification of the proposal shall be given by the applicant to all affected adjacent jurisdictions, the Division of Soil and Water Conservation (Department of Conservation and Recreation), and the Federal Insurance Administration.

##### **C. Drainage Facilities**

Storm drainage facilities shall be designed to convey the flow of storm water runoff in a safe

and efficient manner. The system shall insure proper drainage along streets, and provide positive drainage away from buildings. The system shall also be designed to prevent the discharge of excess runoff onto adjacent properties.

#### D. Site Plans and Permit Applications

All applications for development in the floodplain district and all building permits issued for the floodplain shall incorporate the following information:

1. For structures to be elevated, the elevation of the lowest floor (including basement).
2. For structures to be flood-proofed (non-residential only), the elevation to which the structure will be flood-proofed.
3. The elevation of the one hundred (100)-year flood.
4. Topographic information showing existing and proposed ground elevations.

#### E. Recreational Vehicles

Recreational vehicles placed on sites shall either:

- (i) Be on the site for fewer than 180 consecutive days, be fully licensed and ready for highway use, or
- (ii) Meet the permit requirements for placement and the elevation and anchoring requirements for manufactured homes in Uniform Statewide Building Code.

A recreational vehicle is ready for highway use if it is on its wheels or jacking system, is attached to the site only by quick disconnect type utilities and security devices, and has no permanently attached additions.

#### Section 4.2. Approximated Floodplain District

In the Approximated Floodplain District, the development and/or use of land shall be permitted in accordance with the regulations of the underlying district provided that all such uses, activities, and/or development shall be undertaken in strict compliance with the flood-proofing and related provisions contained in the Virginia Uniform Statewide Building Code and all other applicable codes and ordinances. All new subdivision proposals and other proposed developments (including proposals for manufactured home parks and subdivisions) greater than 50 lots or five acres, whichever is the lesser, include within such proposals base flood elevation data. The applicant shall also delineate a floodway area based on the requirement that all existing and future development not increase the one hundred (100)-year flood elevation more than one foot at any one point. The engineering principle --equal reduction of conveyance--shall be used to make the determination of increased flood heights.

Within the floodway area delineated by the applicant, no development shall be permitted that will

cause any increase in the one hundred (100) year flood elevation.

## **ARTICLE V - VARIANCES: FACTORS TO BE CONSIDERED**

In passing upon applications for Variances, the Board of Zoning Appeals shall satisfy all relevant factors and procedures specified in other sections of the zoning ordinance and consider the following additional factors:

- A. The danger to life and property due to increased flood heights or velocities caused by encroachments. No variance shall be granted for any proposed use, development, or activity within any Floodway District that will cause any increase in the one hundred (100)-year flood elevation.
- B. The danger that materials may be swept on to other lands or downstream to the injury of others.
- C. The proposed water supply and sanitation systems and the ability of these systems to prevent disease, contamination, and unsanitary conditions.
- D. The susceptibility of the proposed facility and its contents to flood damage and the effect of such damage on the individual owners.
- E. The importance of the services provided by the proposed facility to the community.
- F. The requirements of the facility for a waterfront location.
- G. The availability of alternative locations not subject to flooding for the proposed use.
- H. The compatibility of the proposed use with existing development and development anticipated in the foreseeable future.
- I. The relationship of the proposed use to the comprehensive plan and floodplain management program for the area.
- J. The safety of access by ordinary and emergency vehicles to the property in time of flood.
- K. The expected heights, velocity, duration, rate of rise , and sediment transport of the flood waters expected at the site.
- L. The repair or rehabilitation of historic structures upon a determination that the proposed repair or rehabilitation will not preclude the structure's continued designation as a historic structure and the variance is the minimum necessary to preserve the historic character and design of the structure.
- M. Such other factors which are relevant to the purposes of this ordinance.

The Board of Zoning Appeals may refer any application and accompanying documentation

pertaining to any request for a variance to any engineer or other qualified person or agency for technical assistance in evaluating the proposed project in relation to flood heights and velocities, and the adequacy of the plans for flood protection and other related matters.

Variances shall be issued only after the Board of Zoning Appeals has determined that the granting of such will not result in (a) unacceptable or prohibited increases in flood heights, (b) additional threats to public safety, (c) extraordinary public expense; and will not (d) create nuisances, (e) cause fraud or victimization of the public, or (f) conflict with local laws or ordinances. Variances shall be issued only after the Board of Zoning Appeals has determined that variance will be the minimum required to provide relief from any hardship to the applicant.

The Board of Zoning Appeals shall notify the applicant for a variance, in writing, that the issuance of a variance to construct a structure below the one hundred (100)-year flood elevation (a) increases the risks to life and property and (b) will result in increased premium rates for flood insurance.

A record shall be maintained of the above notification as well as all variance actions, including justification for the issuance of the variances. Any variances which are issued shall be noted in the annual or biennial report submitted to the Federal Insurance Administrator.

## **ARTICLE VI - EXISTING STRUCTURES IN FLOODPLAIN DISTRICTS**

A structure or use of a structure or premises which lawfully existed before the enactment of these provisions, but which is not in conformity with these provisions, may be continued subject to the following conditions:

- A. Existing structures in the Floodway District shall not be expanded or enlarged unless it has been demonstrated through hydrologic and hydraulic analyses performed in accordance with standard engineering practice that the proposed expansion would not result in any increase in the one hundred (100) year flood elevation.
- B. Any modifications, alteration, repair, reconstruction, or improvement of any kind to a structure and/or use located in any floodplain area to an extent or amount of less than fifty (50) percent of its market value, elevation and/or flood-proofing should be considered to the greatest extent possible.
- C. The modification, alteration, repair, reconstruction, or improvement of any kind to a structure and/or use, regardless of its locations in a floodplain area, to an extent or amount of fifty (50) percent or more of its market value shall be undertaken only in full compliance with the provisions of this ordinance and the Virginia Uniform Statewide Building Code.

**ARTICLE VII - ENACTMENT**

ENACTED AND ORDAINED THIS \_\_\_\_ DAY OF \_\_\_\_\_, 200\_\_\_. This ordinance shall become effective upon passage.

Signed: \_\_\_\_\_  
*{Title}*

Attested: \_\_\_\_\_  
*{Title}*

Explanatory Note

These suggested provisions have been prepared for use by municipalities having to comply with the requirements of **Section 60.3(c)\*** of the National Flood Insurance Program regulations. Your municipal attorney and engineer should be consulted in preparing the necessary ordinance or ordinances.

In using these provisions, certain things must be understood and kept in mind:

- These provisions cannot be adopted verbatim. Every municipality making use of these provisions will have to make some choices and modifications, depending upon the kinds of flood hazard districts and information contained in its Flood Insurance Study, and the community's own particular circumstances and objectives or policy.
- These provisions alone will not meet all the Flood Insurance Program requirements. They are zoning provisions only, and must be used in combination with other kinds of regulations (i.e., Uniform Statewide Building Code and subdivision regulations) in order to meet all of the Program requirements.
- These provisions are not classical "model" floodplain management regulations. With few exceptions, they have been prepared only with the intention of meeting the minimum requirements of the National Flood Insurance Program. Any municipality that may be interested could do considerably more concerning the regulation of development in flood-prone districts.

More stringent local requirements are encouraged, and would be supported by both the Federal Emergency Management Agency and the Division of Soil and Water Conservation (Department of Conservation and Recreation). The more restrictive local regulations would be recognized as taking precedence over the federal minimum guidelines. The needs, circumstances, and objectives of the municipalities are so diverse that the development of a single ordinance or set of provisions for use by all is literally impossible.

If there are any questions concerning these suggested provisions or concerning the National Flood Insurance Program, the Division of Soil and Water Conservation (Department of Conservation and Recreation) (804) 371-6135 or the Philadelphia Regional Office (215) 931-5500 should be contacted without hesitation.

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*\* Section 60.3(c) details what the community must do after the Federal Insurance Administrator has provided a notice of final base flood elevations for one or more special flood hazard areas on the community's Flood Insurance Rate Map (FIRM) or has designated other special flood hazard areas without base flood elevations on the community's FIRM.*

**ORDINANCE NO. \_\_\_\_\_**

AN ORDINANCE AMENDING ORDINANCE NO. \_\_\_\_\_, THE ZONING ORDINANCE OF Name of Municipality, VIRGINIA, BY ESTABLISHING FLOODPLAIN DISTRICTS, BY REQUIRING THE ISSUANCE OF PERMITS FOR DEVELOPMENT, AND BY PROVIDING FACTORS AND CONDITIONS FOR VARIANCES TO THE TERMS OF THE ORDINANCES.

BE IT ENACTED AND ORDAINED BY THE Name of Governing Body, Name of Municipality, Virginia, as follows:

**ARTICLE I - GENERAL PROVISIONS**

Section 1.1 - Purpose

The purpose of these provisions is to prevent the loss of life and property, the creation of health and safety hazards, the disruption of commerce and governmental services, the extraordinary and unnecessary expenditure of public funds for flood protection and relief, and the impairment of the tax base by:

- A. Regulating uses, activities, and development which, alone or in combination with other existing or future uses, activities, and development, will cause unacceptable increases in flood heights, velocities, and frequencies.
- B. Restricting or prohibiting certain uses, activities, and development from locating within districts subject to flooding.
- C. Requiring all those uses, activities, and developments that do occur in flood-prone districts to be protected and/or flood-proofed against flooding and flood damage.
- D. Protecting individuals from buying land and structures which are unsuited for intended purposes because of flood hazards.

Section 1.2 - Applicability

These provisions shall apply to all lands within the jurisdiction of Name of Municipality and identified as being in the 100-year floodplain by the Federal Insurance Administration.

Section 1.3 - Compliance and Liability

- A. No land shall hereafter be developed and no structure shall be located, relocated, constructed, reconstructed, enlarged, or structurally altered except in full compliance with the terms and provisions of this ordinance and any other applicable ordinances and regulations which apply to uses within the jurisdiction of this ordinance.
- B. The degree of flood protection sought by the provisions of this ordinance is considered reasonable for regulatory purposes and is based on acceptable engineering methods of study.

Larger floods may occur on rare occasions. Flood heights may be increased by man-made or natural causes, such as ice jams and bridge openings restricted by debris. This ordinance does not imply that districts outside the floodplain district, or that land uses permitted within such district will be free from flooding or flood damages.

- C. This ordinance shall not create liability on the part of *Name of Municipality* or any officer or employee thereof for any flood damages that result from reliance on this ordinance or any administrative decision lawfully made thereunder.

#### Section 1.4 - Abrogation and Greater Restrictions

This ordinance supersedes any ordinance currently in effect in flood-prone districts. However, any underlying ordinance shall remain in full force and effect to the extent that its provisions are more restrictive than this ordinance.

#### Section 1.5 - Severability

If any section, subsection, paragraph, sentence, clause, or phrase of this ordinance shall be declared invalid for any reason whatever, such decision shall not affect the remaining portions of this ordinance. The remaining portions shall remain in full force and effect; and for this purpose, the provisions of this ordinance are hereby declared to be severable.

### **ARTICLE II - DEFINITIONS**

- A. Base Flood/One-Hundred Year Flood - A flood that, on the average, is likely to occur once every 100 years (i.e., that has a one (1) percent chance of occurring each year, although the flood may occur in any year).
- B. Base Flood Elevation (BFE) - The Federal Emergency Management Agency designated 100 year water surface elevation. (NOTE: ADD "ONE OR MORE FEET" TO END OF SENTENCE TO OBTAIN A GREATER LEVEL OF FLOOD PROTECTION.)
- C. Basement - Any area of the building having its floor subgrade (below ground level) on all sides.
- D. Board of Zoning Appeals - The board appointed to review appeals made by individuals with regard to decisions of the Zoning Administrator in the interpretation of this ordinance.
- E. Development - Any man-made change to improved or unimproved real estate, including, but not limited to, buildings or other structures, mining, dredging, filling, grading, paving, excavation or drilling operations or storage of equipment or materials.
- F. Floodplain - Any land area susceptible to being inundated by water from any source.
- G. Floodway - The channel of a river or other watercourse and the adjacent land areas that must be reserved in order to discharge the base flood without cumulatively increasing the water surface elevation more than a designated height.

- H. Freeboard - A factor of safety usually expressed in feet above a flood level for purposes of floodplain management.
- I. Lowest Floor - The lowest floor of the lowest enclosed area (including basement).
- J. Recreational Vehicle - A vehicle which is:
  - (a) built on a single chassis;
  - (b) 400 square feet or less when measured at the largest horizontal projection;
  - (c) designed to be self-propelled or permanently towable by a light duty truck; and
  - (d) designed primarily not for use as a permanent dwelling but as temporary living quarters for recreational camping, travel, or seasonal use.
- K. Substantial Damage - Damage of any origin sustained by a structure whereby the cost of restoring the structure to its before damaged condition would equal or exceed 50 percent of the market value of the structure before the damage occurred.
- L. Substantial Improvement - Any reconstruction, rehabilitation, addition, or other improvement of a structure, the cost of which equals or exceeds 50 percent of the market value of the structure before the "start of construction" of the improvement. This term includes structures which have incurred "substantial damage" regardless of the actual repair work performed. The term does not, however, include either: (1) any project for improvement of a structure to correct existing violations of state or local health, sanitary, or safety code specifications which have been identified by the local code enforcement official and which are the minimum necessary to assure safe living conditions or (2) any alteration of a "historic structure", provided that the alteration will not preclude the structures continued designation as a "historic structure".

## **ARTICLE III - ESTABLISHMENT OF ZONING DISTRICTS**

### **Section 3.1 - Description of Districts**

#### **A. Basis of Districts**

The floodplain district shall include areas subject to inundation by waters of the one hundred (100)-year flood. The basis for the delineation of the district shall be the one hundred (100)-year flood elevations or profiles contained in the Flood Insurance Study (FIS) and the accompanying Flood Insurance Rate Maps (FIRMs) for Name of Municipality prepared by the Federal Emergency Management Agency, Federal Insurance Administration, dated \_\_\_\_\_, as amended. (**NOTE:** *Those communities that had FIS prepared by the Department of Housing and Urban Development should delete FEMA and add HUD.*)

***Note:***

*This section is for use where a floodplain has been delineated but no detailed information concerning flood profiles and elevations is included.*

The Approximated Floodplain District shall be that floodplain area for which no detailed flood profiles or elevations are provided, but where a one hundred (100)-year floodplain boundary has been approximated. Such areas are shown as Zone A on the maps accompanying the Flood Insurance Study. For these areas, the one hundred (100)-year flood elevations and floodway information from federal, state, and other acceptable sources shall be used, when available. Where the specific one hundred (100)-year flood elevation cannot be determined for this area using other sources of data, such as the U. S. Army Corps of Engineers Floodplain Information Reports, U. S. Geological Survey Flood-Prone Quadrangles, etc., then the applicant for the proposed use, development and/or activity shall determine this elevation in accordance with hydrologic and hydraulic engineering techniques. Hydrologic and hydraulic analyses shall be undertaken only by professional engineers or others of demonstrated qualifications, who shall certify that the technical methods used correctly reflect currently-accepted technical concepts. Studies, analyses, computations, etc., shall be submitted in sufficient detail to allow a thorough review by the Name of Municipality.

**B. Overlay Concept**

1. The Floodplain District described above shall be overlays to the existing underlying area as shown on the Official Zoning Ordinance Map, and as such, the provisions for the floodplain district shall serve as a supplement to the underlying district provisions.
2. Any conflict between the provisions or requirements of the Floodplain Districts and those of any underlying district, the more restrictive provisions and/or those pertaining to the floodplain districts shall apply.
3. In the event any provision concerning a Floodplain District is declared inapplicable as a result of any legislative or administrative actions or judicial decision, the basic underlying provisions shall remain applicable.

**Section 3.2 - Official Zoning Map**

The boundaries of the Floodplain District are established as shown on the Flood Insurance Rate Map which is declared to be a part of this ordinance and which shall be kept on file at the Name of Municipality offices.

**Section 3.3 - District Boundary Changes**

The delineation of any of the Floodplain District may be revised by the Name of Governing Body where natural or man-made changes have occurred and/or where more detailed studies have been conducted or undertaken by the U. S. Army Corps of Engineers or other qualified agency, or an individual documents the need for such change. However, prior to any such change, approval must be obtained from the Federal Insurance Administration.

**Section 3.4 - Interpretation of District Boundaries**

Initial interpretations of the boundaries of the Floodplain District shall be made by the Zoning Officer. Should a dispute arise concerning the boundaries of any of the Districts, the Board of Zoning Appeals shall make the necessary determination. The person questioning or contesting the location of the District boundary shall be given a reasonable opportunity to present his case to the Board and to submit his own technical evidence if he so desires.

## **ARTICLE IV - DISTRICT PROVISIONS**

### Section 4.1 - General Provisions

#### **A. Permit Requirement**

All uses, activities, and development occurring within any Floodplain District shall be undertaken only upon the issuance of a zoning permit. Such development shall be undertaken only in strict compliance with the provisions of the Ordinance and with all other applicable codes and ordinances, such as the Virginia Uniform Statewide Building Code and the *Name of Municipality* Subdivision Regulations. Prior to the issuance of any such permit, the Zoning Officer shall require all applications to include compliance with all applicable state and federal laws. Under no circumstances shall any use, activity, and/or development adversely affect the capacity of the channels or floodway of any watercourse, drainage ditch, or any other drainage facility or system.

#### **B. Alteration or Relocation of Watercourse**

Prior to any proposed alteration or relocation of any channels or of any watercourse, stream, etc., within this jurisdiction a permit shall be obtained from the U. S. Corps of Engineers, the Virginia Department of Environmental Quality, and the Virginia Marine Resources Commission (a joint permit application is available from any of these organizations). Furthermore, notification of the proposal shall be given by the applicant to all affected adjacent jurisdictions, the Division of Soil and Water Conservation (Department of Conservation and Recreation), and the Federal Insurance Administration.

#### **C. Drainage Facilities**

Storm drainage facilities shall be designed to convey the flow of storm water runoff in a safe and efficient manner. The system shall insure proper drainage along streets, and provide positive drainage away from buildings. The system shall also be designed to prevent the discharge of excess runoff onto adjacent properties.

#### **D. Site Plans and Permit Applications**

All applications for development in the floodplain district and all building permits issued for the floodplain shall incorporate the following information:

1. For structures to be elevated, the elevation of the lowest floor (including basement).

2. For structures to be flood-proofed (non-residential only), the elevation to which the structure will be flood-proofed.
3. The elevation of the one hundred (100)-year flood.
4. Topographic information showing existing and proposed ground elevations.

E. Encroachment Provisions

1. No new construction or development shall be permitted within the floodplain district unless it is demonstrated that the cumulative effect of the proposed development, when combined with all other existing and anticipated development, will not increase the one hundred (100)-year flood elevation more than one foot at any point.
2. Within any floodway area, no encroachments, including fill, new construction, substantial improvements, or other development shall be permitted unless it has been demonstrated through hydrologic and hydraulic analyses performed in accordance with standard engineering practice that the proposed encroachment would not result in any increase in the one hundred (100)-year flood elevation.

F. Recreational Vehicles

Recreational vehicles placed on sites shall either:

- (i) Be on the site for fewer than 180 consecutive days, be fully licensed and ready for highway use, or
- (ii) Meet the permit requirements for placement and the elevation and anchoring requirements for manufactured homes as contained in the Uniform Statewide Building Code.

A recreational vehicle is ready for highway use if it is on its wheels or jacking system, is attached to the site only by quick disconnect type utilities and security devices, and has no permanently attached additions.

Section 4.2. Approximated Floodplain District

In the Approximated Floodplain District, the development and/or use of land shall be permitted in accordance with the regulations of the underlying district provided that all such uses, activities, and/or development shall be undertaken in strict compliance with the flood-proofing and related provisions contained in the Virginia Uniform Statewide Building Code and all other applicable codes and ordinances. All new subdivision proposals and other proposed developments (including proposals for manufactured home parks and subdivisions) greater than 50 lots or five acres, whichever is the lesser, include within such proposals base flood elevation data. The applicant shall also delineate a floodway area based on the requirement that all existing and future development not increase the one hundred (100)-year flood elevation more than one foot at any one point. The

engineering principle --equal reduction of conveyance--shall be used to make the determination of increased flood heights.

Within the floodway area delineated by the applicant, no development shall be permitted that will cause any increase in the one hundred (100) year flood elevation.

## **ARTICLE V - VARIANCES: FACTORS TO BE CONSIDERED**

In passing upon applications for Variances, the Board of Zoning Appeals shall satisfy all relevant factors and procedures specified in other sections of the zoning ordinance and consider the following additional factors:

- A. The danger to life and property due to increased flood heights or velocities caused by encroachments. No variance shall be granted for any proposed use, development, or activity within any floodway that will cause any increase in the one hundred (100)-year flood elevation.
- B. The danger that materials may be swept on to other lands or downstream to the injury of others.
- C. The proposed water supply and sanitation systems and the ability of these systems to prevent disease, contamination, and unsanitary conditions.
- D. The susceptibility of the proposed facility and its contents to flood damage and the effect of such damage on the individual owners.
- E. The importance of the services provided by the proposed facility to the community.
- F. The requirements of the facility for a waterfront location.
- G. The availability of alternative locations not subject to flooding for the proposed use.
- H. The compatibility of the proposed use with existing development and development anticipated in the foreseeable future.
- I. The relationship of the proposed use to the comprehensive plan and floodplain management program for the area.
- J. The safety of access by ordinary and emergency vehicles to the property in time of flood.
- K. The expected heights, velocity, duration, rate of rise , and sediment transport of the flood waters expected at the site.
- L. The repair or rehabilitation of historic structures upon a determination that the proposed repair or rehabilitation will not preclude the structure's continued designation as a historic structure and the variance is the minimum necessary to preserve the historic character and design of the structure.

M. Such other factors which are relevant to the purposes of this ordinance.

The Board of Zoning Appeals may refer any application and accompanying documentation pertaining to any request for a variance to any engineer or other qualified person or agency for technical assistance in evaluating the proposed project in relation to flood heights and velocities, and the adequacy of the plans for flood protection and other related matters.

Variances shall be issued only after the Board of Zoning Appeals has determined that the granting of such will not result in (a) unacceptable or prohibited increases in flood heights, (b) additional threats to public safety, (c) extraordinary public expense; and will not (d) create nuisances, (e) cause fraud or victimization of the public, or (f) conflict with local laws or ordinances. Variances shall be issued only after the Board of Zoning Appeals has determined that variance will be the minimum required to provide relief from any hardship to the applicant.

The Board of Zoning Appeals shall notify the applicant for a variance, in writing, that the issuance of a variance to construct a structure below the one hundred (100)-year flood elevation (a) increases the risks to life and property and (b) will result in increased premium rates for flood insurance.

A record shall be maintained of the above notification as well as all variance actions, including justification for the issuance of the variances. Any variances which are issued shall be noted in the annual or biennial report submitted to the Federal Insurance Administrator.

## **ARTICLE VI - EXISTING STRUCTURES IN FLOODPLAIN DISTRICTS**

A structure or use of a structure or premises which lawfully existed before the enactment of these provisions, but which is not in conformity with these provisions, may be continued subject to the following conditions:

- A. Existing structures in the Floodway Area shall not be expanded or enlarged unless it has been demonstrated through hydrologic and hydraulic analyses performed in accordance with standard engineering practice that the proposed expansion would not result in any increase in the one hundred (100)-year flood elevation.
- B. Any modifications, alteration, repair, reconstruction, or improvement of any kind to a structure and/or use located in any floodplain area to an extent or amount of less than fifty (50) percent of its market value, elevation and/or flood-proofing should be considered to the greatest extent possible.
- C. The modification, alteration, repair, reconstruction, or improvement of any kind to a structure and/or use, regardless of its locations in a floodplain area, to an extent or amount of fifty (50) percent or more of its market value shall be undertaken only in full compliance with the provisions of this ordinance and the Virginia Uniform Statewide Building Code.

## **ARTICLE VII - ENACTMENT**

ENACTED AND ORDAINED THIS \_\_\_\_ DAY OF \_\_\_\_\_, 200\_\_\_. This ordinance shall become effective upon passage.

Signed: \_\_\_\_\_  
*{Title}*

Attested: \_\_\_\_\_  
*{Title}*

Explanatory Note

These suggested provisions have been prepared for use by municipalities having to comply with the requirements of **Section 60.3(d)\*** of the National Flood Insurance Program regulations. Your municipal attorney and engineer should be consulted in preparing the necessary ordinance or ordinances.

In using these provisions, certain things must be understood and kept in mind:

- These provisions cannot be adopted verbatim. Every municipality making use of these provisions will have to make some choices and modifications, depending upon the kinds of flood hazard districts and information contained in its Flood Insurance Study, and the community's own particular circumstances and objectives or policy.
- These provisions alone will not meet all the Flood Insurance Program requirements. They are zoning provisions only, and must be used in combination with other kinds of regulations (i.e., Uniform Statewide Building Code and subdivision regulations) in order to meet all of the Program requirements.
- These provisions are not classical "model" floodplain management regulations. With few exceptions, they have been prepared only with the intention of meeting the minimum requirements of the National Flood Insurance Program. Any municipality that may be interested could do considerably more concerning the regulation of development in flood-prone districts.

More stringent local requirements are encouraged, and would be supported by both the Federal Emergency Management Agency and the Division of Soil and Water Conservation, Department of Conservation and Recreation. The more restrictive local regulations would be recognized as taking precedence over the federal minimum guidelines. The needs, circumstances, and objectives are so diverse that the development of a single ordinance or set of provisions for use by all is literally impossible.

If there are any questions concerning these suggested provisions or concerning the National Flood Insurance Program, the Division of Soil and Water Conservation (Department of Conservation and Recreation) (804) 371-6135 or the Philadelphia Regional Office (215) 931-5514 should be contacted without hesitation.

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*\* Section 60.3(d) details what the community must do after the Federal Insurance Administrator has provided a notice of final base flood elevations within zones on the community's Flood Insurance Rate Map and has provided data from which the community must designate its regulated floodway.*

Explanatory Note

These suggested provision have been prepared for use by municipalities having to comply with the requirements of **Section 60.3(e)\*** of the National Flood Insurance Program regulations. Your municipal attorney and engineer should be consulted in preparing the necessary ordinance or ordinances.

In using these provisions, certain things must be understood and kept in mind:

- These provisions cannot be adopted verbatim. Every municipality making use of these provisions will have to make some choices and modifications, depending upon the kinds of flood hazard areas and information contained in its Flood Insurance Study, and the community's own particular circumstances and objectives or policy.
- These provisions alone will not meet all the Flood Insurance Program requirements. They are supplemental only, and must be used in combination with other kinds of regulations (i.e., Uniform Statewide Building Code and subdivision regulations) in order to meet all of the Program requirements.
- These provisions are not classical "model" floodplain management regulations. With few exceptions, they have been prepared only with the intention of meeting the minimum requirements of the National Flood Insurance Program. Any municipality that may be interested could do considerably more concerning the regulation of development in flood-prone areas.

More stringent local requirements are encouraged, and would be supported by the Federal Emergency Management Agency. The more restrictive local regulations would be recognized as taking precedence over the federal minimum guidelines. The needs, circumstances, and objectives of the municipalities are so diverse that the development of a single ordinance or set of provisions for use by all is literally impossible.

If there are any questions concerning these suggested provisions or concerning the National Flood Insurance Program, the Division of Soil and Water Conservation (Department of Conservation and Recreation) (804) 371-7487 or the Philadelphia Regional Office (215-931-5516) should be contacted without hesitation.

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*\* Section 60.3(e) details what the community must do after the Federal Insurance Administrator has provided a notice of base flood elevations within Zones A1-30 and/or AE on the community's FIRM and, if appropriate, has designated AH zones, AO zones, A99 zones, and A zones on the community's FIRM, and has identified on the community's FIRM coastal high hazard areas by designating Zones V1-30, VE, and V or V.*

In **Article II**, DEFINITIONS, add the following to "C" or "D" level model ordinances:

- A. Breakaway wall -A wall that is not part of the structural support of the building and is intended through its design and construction to the elevated portion of the building or supporting foundation system.
- B. Coastal High-Hazard Area - An area of special flood hazard extending from offshore to the inland limit of a primary frontal dune along an open coast and any other area subject to high velocity wave action from storms or seismic sources.
- C. Mangrove Stand - - An assemblage of mangrove trees which are mostly low trees noted for a copious development of interlacing adventitious roots above the ground and which contain one or more of the following species: black mangrove (*Avicennia Nitida*); red mangrove (*Rhizophora Mangle*); white mangrove (*Languncularia Racemosa*); and buttonwood (*Conocarpus Erecta*).
- D. Primary frontal dune - A continuous or nearly continuous mound or ridge of sand with relatively steep seaward and landward slopes immediately landward and adjacent the beach and overtopping from high tides and waves during major coastal storms. The inland limit of the primary frontal dune occurs at the point where there is distinct change from a relatively steep slope to a relatively mild slope.

Add to **Article IV** of the "C" or "D" level model ordinances:

Section 4() - Coastal High-Hazard Areas

These areas have special flood hazards associated with wave wash; therefore, the following additional provisions shall apply.

- A. All new construction shall be located (\_\_\_\_feet) landward of the reach of mean high tide.
- B. There shall be no alteration of sand dunes or mangrove stands which would increase potential flood damage.
- C. Within V-Zones on the Flood Insurance Rate Map, obtain and record the elevation (in relation to mean sea level) of the bottom of the lowest horizontal structural member of the lowest floor (excluding pilings and columns) of all new and substantially improved structures, and whether or not such structures contain a basement on permit applications.
- D. All manufactured homes to be placed or substantially improved within V-Zones shall comply with the same standards as set forth for conventional housing in V-Zones.
- E. All recreational vehicles placed in V-Zones either be (i) on site for fewer than 180 consecutive days, (ii) be fully licensed and ready for highway use, or (iii) meet the same standards as for conventional housing in V-Zones.
- F. The use of fill for structural support of buildings is prohibited.

**ORDINANCE NO. \_\_\_\_**

AN ORDINANCE AMENDING ORDINANCE NO. \_\_\_\_, THE ZONING ORDINANCE OF Name of Municipality, VIRGINIA, BY ESTABLISHING FLOODPLAIN DISTRICTS, BY REQUIRING THE ISSUANCE OF PERMITS FOR DEVELOPMENT, AND BY PROVIDING FACTORS AND CONDITIONS FOR VARIANCES TO THE TERMS OF THE ORDINANCES.

BE IT ENACTED AND ORDAINED BY THE Name of Governing Body, Name of Municipality, Virginia, as follows:

**ARTICLE I - GENERAL PROVISIONS**

Section 1.1 - Purpose

The purpose of these provisions is to prevent the loss of life and property, the creation of health and safety hazards, the disruption of commerce and governmental services, the extraordinary and unnecessary expenditure of public funds for flood protection and relief, and the impairment of the tax base by:

- A. Regulating uses, activities, and development which, alone or in combination with other existing or future uses, activities, and development, will cause unacceptable increases in flood heights, velocities, and frequencies.
- B. Restricting or prohibiting certain uses, activities, and development from locating within districts subject to flooding.
- C. Requiring all those uses, activities, and developments that do occur in flood-prone districts to be protected and/or flood-proofed against flooding and flood damage.
- D. Protecting individuals from buying land and structures which are unsuited for intended purposes because of flood hazards.

Section 1.2 - Applicability

These provisions shall apply to all lands within the jurisdiction of Name of Municipality and identified as being in the 100-year floodplain by the Federal Insurance Administration.

Section 1.3 - Compliance and Liability

- A. No land shall hereafter be developed and no structure shall be located, relocated, constructed, reconstructed, enlarged, or structurally altered except in full compliance with the terms and provisions of this ordinance and any other applicable ordinances and regulations which apply to uses within the jurisdiction of this ordinance.

- B. The degree of flood protection sought by the provisions of this ordinance is considered reasonable for regulatory purposes and is based on acceptable engineering methods of study. Larger floods may occur on rare occasions. Flood heights may be increased by man-made or natural causes, such as ice jams and bridge openings restricted by debris. This ordinance does not imply that districts outside the floodplain district, or that land uses permitted within such district will be free from flooding or flood damages.
- C. This ordinance shall not create liability on the part of Name of Municipality or any officer or employee thereof for any flood damages that result from reliance on this ordinance or any administrative decision lawfully made thereunder.

#### Section 1.4 - Abrogation and Greater Restrictions

This ordinance supersedes any ordinance currently in effect in flood-prone districts. However, any underlying ordinance shall remain in full force and effect to the extent that its provisions are more restrictive than this ordinance.

#### Section 1.5 - Severability

If any section, subsection, paragraph, sentence, clause, or phrase of this ordinance shall be declared invalid for any reason whatever, such decision shall not affect the remaining portions of this ordinance. The remaining portions shall remain in full force and effect; and for this purpose, the provisions of this ordinance are hereby declared to be severable.

### **ARTICLE II - DEFINITIONS**

- A. Base Flood/One-Hundred Year Flood - A flood that, on the average, is likely to occur once every 100 years (i.e., that has a one (1) percent chance of occurring each year, although the flood may occur in any year).
- B. Base Flood Elevation (BFE) - The Federal Emergency Management Agency designated 100 year water surface elevation. ( NOTE: ADD "ONE OR MORE FEET" TO END OF SENTENCE TO OBTAIN A GREATER LEVEL OF FLOOD PROTECTION.)
- C. Basement - Any area of the building having its floor subgrade (below ground level) on all sides.
- D. Board of Zoning Appeals - The board appointed to review appeals made by individuals with regard to decisions of the Zoning Administrator in the interpretation of this ordinance.
- E. Development - Any man-made change to improved or unimproved real estate, including, but not limited to, buildings or other structures, mining, dredging, filling, grading, paving, excavation or drilling operations or storage of equipment or materials.
- F. Floodplain - Any land area susceptible to being inundated by water from any source.

- G. Floodway - The channel of a river or other watercourse and the adjacent land areas that must be reserved in order to discharge the base flood without cumulatively increasing the water surface elevation more than a designated height.
- H. Freeboard - A factor of safety usually expressed in feet above a flood level for purposes of floodplain management.
- I. Lowest Floor - The lowest floor of the lowest enclosed area (including basement).
- J. Recreational Vehicle - A vehicle which is:
  - (a) built on a single chassis;
  - (b) 400 square feet or less when measured at the largest horizontal projection;
  - (c) designed to be self-propelled or permanently towable by a light duty truck; and
  - (d) designed primarily not for use as a permanent dwelling but as temporary living quarters for recreational camping, travel, or seasonal use.
- K. Substantial Damage - Damage of any origin sustained by a structure whereby the cost of restoring the structure to its before damaged condition would equal or exceed 50 percent of the market value of the structure before the damage occurred.
- L. Substantial Improvement - Any reconstruction, rehabilitation, addition, or other improvement of a structure, the cost of which equals or exceeds 50 percent of the market value of the structure before the "start of construction" of the improvement. This term includes structures which have incurred "substantial damage" regardless of the actual repair work performed. The term does not, however, include either: (1) any project for improvement of a structure to correct existing violations of state or local health, sanitary, or safety code specifications which have been identified by the local code enforcement official and which are the minimum necessary to assure safe living conditions or (2) any alteration of a "historic structure", provided that the alteration will not preclude the structures continued designation as a "historic structure".

### **ARTICLE III - ESTABLISHMENT OF ZONING DISTRICTS**

#### **Section 3.1 - Description of Districts**

##### **A. Basis of Districts**

The various floodplain districts shall include areas subject to inundation by waters of the one hundred (100)-year flood. The basis for the delineation of these districts shall be the Flood Insurance Study (FIS) for Name of Municipality prepared by the Federal Emergency Management Agency, Federal Insurance Administration, dated \_\_\_\_\_, as amended. *(NOTE: Those communities that had FIS prepared by the Department of Housing and Urban Development should delete FEMA and add HUD)*

**Note:**

*Subsections 1 and 2 are for use where a floodway has been delineated and separate floodway and flood-fringe districts will be established.*

1. The Floodway District is delineated, for purposes of this ordinance, using the criterion that certain areas within the floodplain must be capable of carrying the waters of the one hundred (100)-year flood without increasing the water surface elevation of that flood more than one (1) foot at any point. The areas included in this District are specifically defined in Table \_\_\_\_ of the above-referenced Flood Insurance Study and shown on the accompanying Flood Boundary and Floodway Map or Flood Insurance Rate Map.
2. The Flood-Fringe District shall be that area of the one hundred (100)-year floodplain not included in the Floodway District. The basis for the outermost boundary of the District shall be the one hundred (100)-year flood elevations contained in the flood profiles of the above-referenced Flood Insurance Study and as shown on the accompanying Flood Boundary and Floodway Map or Flood Insurance Rate Map.
3. The Approximated Floodplain District shall be that floodplain area for which no detailed flood profiles or elevations are provided, but where a one hundred (100)-year floodplain boundary has been approximated. Such areas are shown as Zone A on the maps accompanying the Flood Insurance Study. For these areas, the one hundred (100)-year flood elevations and floodway information from federal, state, and other acceptable sources shall be used, when available. Where the specific one hundred (100)-year flood elevation cannot be determined for this area using other sources of data, such as the U. S. Army Corps of Engineers Floodplain Information Reports, U. S. Geological Survey Flood-Prone Quadrangles, etc., then the applicant for the proposed use, development and/or activity shall determine this elevation in accordance with hydrologic and hydraulic engineering techniques. Hydrologic and hydraulic analyses shall be undertaken only by professional engineers or others of demonstrated qualifications, who shall certify that the technical methods used correctly reflect currently-accepted technical concepts. Studies, analyses, computations, etc., shall be submitted in sufficient detail to allow a thorough review by the Name of Municipality.

**B. Overlay Concept**

1. The Floodplain Districts described above shall be overlays to the existing underlying districts as shown on the Official Zoning Ordinance Map, and as such, the provisions for the floodplain districts shall serve as a supplement to the underlying district provisions.
2. Any conflict between the provisions or requirements of the Floodplain Districts and those of any underlying district, the more restrictive provisions and/or those pertaining to the floodplain districts shall apply.
3. In the event any provision concerning a Floodplain District is declared inapplicable as a result of any legislative or administrative actions or judicial decision, the basic underlying provisions shall remain applicable.

### Section 3.2 - Official Zoning Map

The boundaries of the Floodplain Districts are established as shown on the Flood Boundary and Floodway Map and/or Flood Insurance Rate Map which is declared to be a part of this ordinance and which shall be kept on file at the Name of Municipality offices.

### Section 3.3 - District Boundary Changes

The delineation of any of the Floodplain Districts may be revised by the Name of Name of Governing Body where natural or man-made changes have occurred and/or where more detailed studies have been conducted or undertaken by the U. S. Army Corps of Engineers or other qualified agency, or an individual documents the need for such change. However, prior to any such change, approval must be obtained from the Federal Insurance Administration.

### Section 3.4 - Interpretation of District Boundaries

Initial interpretations of the boundaries of the Floodplain Districts shall be made by the Zoning Officer. Should a dispute arise concerning the boundaries of any of the Districts, the Board of Zoning Appeals shall make the necessary determination. The person questioning or contesting the location of the District boundary shall be given a reasonable opportunity to present his case to the Board and to submit his own technical evidence if he so desires.

## **ARTICLE IV - DISTRICT PROVISIONS**

### Section 4.1 - General Provisions

#### **A. Permit Requirement**

All uses, activities, and development occurring within any floodplain district shall be undertaken only upon the issuance of a zoning permit. Such development shall be undertaken only in strict compliance with the provisions of the Ordinance and with all other applicable codes and ordinances, such as the Virginia Uniform Statewide Building Code and the Name of Municipality Subdivision Regulations. Prior to the issuance of any such permit, the Zoning Officer shall require all applications to include compliance with all applicable state and federal laws. Under no circumstances shall any use, activity, and/or development adversely affect the capacity of the channels or floodway of any watercourse, drainage ditch, or any other drainage facility or system.

#### **B. Alteration or Relocation of Watercourse**

Prior to any proposed alteration or relocation of any channels or of any watercourse, stream, etc., within this jurisdiction a permit shall be obtained from the U. S. Corps of Engineers, the Virginia Department of Environmental Quality, and the Virginia Marine Resources Commission (a joint permit application is available from any of these organizations). Furthermore, notification of the proposal shall be given by the applicant to all affected adjacent jurisdictions,

the Department of Conservation and Recreation (Division of Soil and Water Conservation) and the Federal Insurance Administration.

C. Drainage Facilities

Storm drainage facilities shall be designed to convey the flow of storm water runoff in a safe and efficient manner. The system shall insure proper drainage along streets, and provide positive drainage away from buildings. The system shall also be designed to prevent the discharge of excess runoff onto adjacent properties.

D. Site Plans and Permit Applications

All applications for development in the floodplain district and all building permits issued for the floodplain shall incorporate the following information:

1. For structures to be elevated, the elevation of the lowest floor (including basement).
2. For structures to be floodproofed (non-residential only), the elevation to which the structure will be floodproofed.
3. The elevation of the one hundred (100)-year flood.
4. Topographic information showing existing and proposed ground elevations.

E. Recreational Vehicles

Recreational vehicles placed on sites either:

- (I) Be on the site for fewer than 180 consecutive days, be fully licensed and ready for highway use, or
- (ii) Meet the permit requirements for placement and the elevation and anchoring requirements for manufactured homes as contained in the Uniform Statewide Building Code.

A recreational vehicle is ready for highway use if it is on its wheels or jacking system, is attached to the site only by quick disconnect type utilities and security devices, and has no permanently attached additions.

Section 4.2 - Floodway District

In the Floodway District no encroachments, including fill, new construction, substantial improvements, or other development shall be permitted unless it has been demonstrated through hydrologic and hydraulic analyses performed in accordance with standard engineering practice that the proposed encroachment would not result in any increase in the one hundred (100)-year flood elevation.

***NOTE: THE FOLLOWING SECTION IS OPTIONAL***

Section 4.3 - Permitted Uses in the Floodway District

*The following uses and activities are permitted provided that they are in compliance with the provisions of the underlying area and are not prohibited by any other ordinance and provided that they do not require structures, fill, or storage of materials and equipment:*

- A. Agricultural uses, such as general farming, pasture, grazing, outdoor plant nurseries, horticulture, truck farming, forestry, sod farming, and wild crop harvesting.*
- B. Public and private recreational uses and activities, such as parks, day camps, picnic grounds, golf courses, boat launching and swimming areas, horseback riding and hiking trails, wildlife and nature preserves, game farms, fish hatcheries, trap and skeet game ranges, and hunting and fishing areas.*
- C. Accessory residential uses, such as yard areas, gardens, play areas, and pervious loading areas.*
- D. Accessory industrial and commercial uses, such as yard areas, pervious parking and loading areas, airport landing strips, etc.*

Section 4.4 - Flood-fringe and Approximated Floodplain Districts

In the Flood-Fringe and Approximated Floodplain Districts, the development and/or use of land shall be permitted in accordance with the regulations of the underlying area provided that all such uses, activities, and/or development shall be undertaken in strict compliance with the floodproofing and related provisions contained in the Virginia Uniform Statewide Building Code and all other applicable codes and ordinances.

Within the Approximated Floodplain District, all new subdivision proposals and other purposed developments (including proposals for manufactured home parks and subdivisions) greater than 50 lots or five (5) acres, whichever is the lesser, include within such proposals base flood elevation data.

The applicant shall also delineate a floodway area based on the requirement that all existing and future development not increase the one hundred (100)-year flood elevation more than one foot at any one point. The engineering principle--equal reduction of conveyance--shall be used to make the determination of increased flood heights.

Within the floodway area delineated by the applicant, the provisions of Section 4.2 shall apply.

**ARTICLE V - VARIANCES: FACTORS TO BE CONSIDERED**

In passing upon applications for Variances, the Board of Zoning Appeals shall satisfy all relevant factors and procedures specified in other sections of the zoning ordinance and consider the following additional factors:

- A. The danger to life and property due to increased flood heights or velocities caused by encroachments. No variance shall be granted for any proposed use, development, or activity

within any Floodway District that will cause any increase in the one hundred (100)-year flood elevation.

- B. The danger that materials may be swept on to other lands or downstream to the injury of others.
- C. The proposed water supply and sanitation systems and the ability of these systems to prevent disease, contamination, and unsanitary conditions.
- D. The susceptibility of the proposed facility and its contents to flood damage and the effect of such damage on the individual owners.
- E. The importance of the services provided by the proposed facility to the community.
- F. The requirements of the facility for a waterfront location.
- G. The availability of alternative locations not subject to flooding for the proposed use.
- H. The compatibility of the proposed use with existing development and development anticipated in the foreseeable future.
- I. The relationship of the proposed use to the comprehensive plan and floodplain management program for the area.
- J. The safety of access by ordinary and emergency vehicles to the property in time of flood.
- K. The expected heights, velocity, duration, rate of rise , and sediment transport of the flood waters expected at the site.
- L. The repair or rehabilitation of historic structures upon a determination that the proposed repair or rehabilitation will not preclude the structure's continued designation as a historic structure and the variance is the minimum necessary to preserve the historic character and design of the structure.
- M. Such other factors which are relevant to the purposes of this ordinance.

The Board of Zoning Appeals may refer any application and accompanying documentation pertaining to any request for a variance to any engineer or other qualified person or agency for technical assistance in evaluating the proposed project in relation to flood heights and velocities, and the adequacy of the plans for flood protection and other related matters.

Variances shall be issued only after the Board of Zoning Appeals has determined that the granting of such will not result in (a) unacceptable or prohibited increases in flood heights, (b) additional threats to public safety, 8 extraordinary public expense; and will not (d) create nuisances, (e) cause fraud or victimization of the public, or (f) conflict with local laws or ordinances.

Variances shall be issued only after the Board of Zoning Appeals has determined that variance will be the minimum required to provide relief from any hardship to the applicant.

The Board of Zoning Appeals shall notify the applicant for a variance, in writing, that the issuance of a variance to construct a structure below the one hundred (100)-year flood elevation (a) increases the risks to life and property and (b) will result in increased premium rates for flood insurance.

A record shall be maintained of the above notification as well as all variance actions, including justification for the issuance of the variances. Any variances which are issued shall be noted in the annual or biennial report submitted to the Federal Insurance Administrator.

## **ARTICLE VI - EXISTING STRUCTURES IN FLOODPLAIN DISTRICTS**

A structure or use of a structure or premises which lawfully existed before the enactment of these provisions, but which is not in conformity with these provisions, may be continued subject to the following conditions:

- A. Existing structures in the Floodway District shall not be expanded or enlarged unless it has been demonstrated through hydrologic and hydraulic analyses performed in accordance with standard engineering practice that the proposed expansion would not result in any increase in the one hundred (100)-year flood elevation.
- B. Any modifications, alteration, repair, reconstruction, or improvement of any kind to a structure and/or use located in any floodplain area to an extent or amount of less than fifty (50) percent of its market value, elevation and/or flood-proofing should be considered to the greatest extent possible.
- C. The modification, alteration, repair, reconstruction, or improvement of any kind to a structure and/or use, regardless of its locations in a floodplain area, to an extent or amount of fifty (50) percent or more of its market value shall be undertaken only in full compliance with the provisions of this ordinance and the Virginia Uniform Statewide Building Code.

**ARTICLE VII - ENACTMENT**

ENACTED AND ORDAINED THIS \_\_\_\_ DAY OF \_\_\_\_\_, 19\_\_\_. This ordinance shall become effective upon passage.

\_\_\_\_\_  
Signed

\_\_\_\_\_  
Attested

Explanatory Note

These suggested provision have been prepared for use by municipalities having to comply with the requirements of **Section 60.3(e)\*** of the National Flood Insurance Program regulations. Your municipal attorney and engineer should be consulted in preparing the necessary ordinance or ordinances.

In using these provisions, certain things must be understood and kept in mind:

- These provisions cannot be adopted verbatim. Every municipality making use of these provisions will have to make some choices and modifications, depending upon the kinds of flood hazard areas and information contained in its Flood Insurance Study, and the community's own particular circumstances and objectives or policy.
- These provisions alone will not meet all the Flood Insurance Program requirements. They are supplemental only, and must be used in combination with other kinds of regulations (i.e., Uniform Statewide Building Code and subdivision regulations) in order to meet all of the Program requirements.
- These provisions are not classical "model" floodplain management regulations. With few exceptions, they have been prepared only with the intention of meeting the minimum requirements of the National Flood Insurance Program. Any municipality that may be interested could do considerably more concerning the regulation of development in flood-prone areas.

More stringent local requirements are encouraged, and would be supported by the Federal Emergency Management Agency. The more restrictive local regulations would be recognized as taking precedence over the federal minimum guidelines. The needs, circumstances, and objectives of the municipalities are so diverse that the development of a single ordinance or set of provisions for use by all is literally impossible.

If there are any questions concerning these suggested provisions or concerning the National Flood Insurance Program, the Division of Soil and Water Conservation (Department of Conservation and Recreation) (804) 371-7487 or the Philadelphia Regional Office (215-931-5516) should be contacted without hesitation.

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*\* Section 60.3(e) details what the community must do after the Federal Insurance Administrator has provided a notice of base flood elevations within Zones A1-30 and/or AE on the community's FIRM and, if appropriate, has designated AH zones, AO zones, A99 zones, and A zones on the community's FIRM, and has identified on the community's FIRM coastal high hazard areas by designating Zones V1-30, VE, and \or V.*

In **Article II**, DEFINITIONS, add the following to "C" or "D" level model ordinances:

- A. Breakaway wall -A wall that is not part of the structural support of the building and is intended through its design and construction to the elevated portion of the building or supporting foundation system.
- B. Coastal High-Hazard Area - An area of special flood hazard extending from offshore to the inland limit of a primary frontal dune along an open coast and any other area subject to high velocity wave action from storms or seismic sources.
- C. Mangrove Stand - - An assemblage of mangrove trees which are mostly low trees noted for a copious development of interlacing adventitious roots above the ground and which contain one or more of the following species: black mangrove (*Avicennia Nitida*); red mangrove (*Rhizophora Mangle*); white mangrove (*Languncularia Racemosa*); and buttonwood (*Conocarpus Erecta*).
- D. Primary frontal dune - A continuous or nearly continuous mound or ridge of sand with relatively steep seaward and landward slopes immediately landward and adjacent the beach and overtopping from high tides and waves during major coastal storms. The inland limit of the primary frontal dune occurs at the point where there is distinct change from a relatively steep slope to a relatively mild slope.

Add to **Article IV** of the "C" or "D" level model ordinances:

Section 4() - Coastal High-Hazard Areas

These areas have special flood hazards associated with wave wash; therefore, the following additional provisions shall apply.

- A. All new construction shall be located (\_\_\_\_feet) landward of the reach of mean high tide.
- B. There shall be no alteration of sand dunes or mangrove stands which would increase potential flood damage.
- C. Within V-Zones on the Flood Insurance Rate Map, obtain and record the elevation (in relation to mean sea level) of the bottom of the lowest horizontal structural member of the lowest floor (excluding pilings and columns) of all new and substantially improved structures, and whether or not such structures contain a basement on permit applications.
- D. All manufactured homes to be placed or substantially improved within V-Zones shall comply with the same standards as set forth for conventional housing in V-Zones.
- E. All recreational vehicles placed in V-Zones either be (i) on site for fewer than 180 consecutive days, (ii) be fully licensed and ready for highway use, or (iii) meet the same standards as for conventional housing in V-Zones.
- F. The use of fill for structural support of buildings is prohibited.

# APPENDIX C

## A RECOMMENDED STEP-BY-STEP GUIDE TO FLOODPLAIN MANAGEMENT PERMITTING PROCEDURES

*Reference: Adapted from the Indiana Department of Natural Resources, Division of Water's "Local Floodplain Administrator's Guide" for Virginia*

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***Virginia Local Official's Guide to Floodplain Management***

# RECOMMENDED STEP-BY-STEP GUIDE TO FLOODPLAIN MANAGEMENT PERMITTING PROCEDURES

## STEP 1

The key initial determination in reviewing an application is the location of the proposed development site relative to the SFHAs within the community, as shown on the effective floodplain map (FHBM, FIRM, FBFM) produced by FEMA. *This determination is made by comparing the location of the site with the flood zone delineation shown on the effective map.*

If the site of the proposed development is obviously outside of the shaded A-Zone (SFHA), then floodplain regulations do not apply.

If the project site is in a shaded A-Zone (SFHA) or is a borderline situation proceed to Step 2.

## STEP 2

Determine if the project meets the NFIP or local ordinance definition of “development”.

“Development” includes:

- ♦ construction, reconstruction, or placement of a building or any addition to a building;
- ♦ installing a manufactured home on a site, preparing a site for a manufactured home or installing a recreational vehicle on a site for more than 180 days;
- ♦ installing utilities, erection of walls and fences, construction of roads, or similar projects;
- ♦ construction of flood control structures such as levees, dikes, dams, channel improvements, etc.;
- ♦ mining, dredging, filling, grading, excavation, or drilling operations;
- ♦ construction and/or reconstruction of bridges or culverts;
- ♦ storage of materials; or
- ♦ any other activity that might change the direction, height, or velocity of flood or surface waters.

“Development” does not include activities such as the maintenance of existing buildings and facilities such as painting, re-roofing; resurfacing roads; or gardening, plowing, and similar agricultural practices that do not involve filling, grading, excavation, or the construction of permanent buildings.

If the project does not meet the definition for “development”, then floodplain regulations do not apply. If the project meets this definition, continue to Step 3.

## STEP 3

Have the applicant complete and submit a local Floodplain Permit Application form. The applicant must also provide location information and plans for the proposed project. A location or plat map of the site should be attached to every application form. Plans for the proposed development should also be attached showing existing and proposed conditions including all appropriate dimensions and elevations. Continue to Step 4.

## STEP 4

Check to see if the proposed site is located in the regulatory floodway by measuring the floodway width on the FEMA FBFM (if available) and comparing this distance to the proposed project's actual ground location.

If the site is located in a floodplain where the floodway limits have not been identified and *the drainage area is greater than one square mile\**, the applicant must request and obtain a floodplain analysis/regulatory assessment that includes the base flood elevation and floodway boundary. (In some cases, the applicant may need to supply surveyed cross sections and/or detailed topographic mapping to complete an analysis of the site).

If the site is located in the floodway or in a floodplain where the floodway limits have not been identified and *the drainage area is less than one square mile\**, it is recommended that the applicant provide a hydraulic analysis including a base flood elevation for the site.

If the site is located in a regulatory floodway, do not issue the local permit until the applicant obtains either a Virginia Joint Permit Application (VJPA) or verification/documentation that a VJPA is not required. A copy of the VJPA or verification/documentation should be kept with the local permit application. Keep in mind that a local permit cannot be less restrictive than a State issued permit. If the site is not located in a regulatory floodway, only local floodplain regulations apply and no IDNR permit is needed.

***NOTE:*** *The Virginia Joint Permit Application (VJPA) is used by the US Army Corps of Engineers (Corps), the Virginia Department of Environmental Quality (DEQ), the Virginia Marine Resources Commission (VMRC), and the Local Wetlands Boards for permitting purposes involving water and wetland resources. Please note that some health departments and local agencies, such as local building officials and erosion and sediment control authorities, do not use this application and may have different informational requirements. The applicant is responsible for contacting these agencies for information regarding their permitting requirements.*

If the site is not located in a floodway, continue on to Step 5; if it is, continue to Step 6.

## STEP 5

Check to see if the proposed development is in a V-ZONE? Check FIRM and site elevation. If yes, the permit must comply with special V-Zone construction requirements in the floodplain ordinance.

Continue to Step 6.

## STEP 6

Has the applicant obtained all necessary state and federal permits? Determine if a watercourse will be altered as a result of the proposed development. If so, notify the adjacent communities, federal agencies, and the South Carolina Land, Water and Conservation Division – Flood Mitigation Program. Continue to Step 7.

## STEP 7

Determine if avoidance and minimization may be a consideration. Can the proposed development be modified to avoid flood hazard areas? If not, can impacts be further minimized? Review and modify plans with applicant in an attempt to avoid and minimize flood hazard. Continue to Step 8.

## STEP 8

Determine if the project includes construction of a new building or substantial improvement of an existing building.

A “building” is a structure that is principally above ground and is enclosed by walls and a roof. The term includes a gas or liquid storage tank, a manufactured home, or a prefabricated building. The term also includes recreational vehicles to be installed on a site for more than 180 days.

A “substantial improvement” means any reconstruction, rehabilitation, addition, or other improvement of a structure, the cost of which equals or exceeds 50%\* of the market value of the structure before the “start of construction” of the improvement. This term includes structures which have incurred “substantial damage” regardless of the actual repair work performed. The term does not include improvements of structures to correct existing violations of state or local health, sanitary, or safety code requirements or any alteration of a “historic structure”, provided that the alteration will not preclude the structures’ continued designation as a “historic structure”. *\*Some communities are more restrictive (i.e. 40%)*

If the project includes a new building, a substantial improvement made to an existing previously unaltered building, or a structural alteration made to a previously altered building, proceed to Step 6.

If the project does not include a new building, a substantial improvement made to an existing previously unaltered building, or a structural alteration made to a previously altered building, go on to Step 9.

## STEP 9

Are any non-residential structures proposed that will be flood-proofed in lieu of elevation? Determine the BFE in relation to mean sea level, from the FIRM or Flood Insurance Study, and record it as the flood-proofing level on the Permit. NOTE: To meet the insurance standards for dry-flood-proofing, the applicant must flood-proof to a minimum of one foot above the BFE. A Flood-proofing Certificate, (FEMA Form #81-65) must be completed. Continue to Step 10.

## STEP 10

Are structures or enclosed areas below the BFE to be permitted (sheds, garages, storage areas, crawl spaces)? Determine how the venting requirement will be met and include specifications on plans. Ensure that uses will be limited to parking of vehicles, limited storage, and access. Continue to Step 11.

## STEP 11

Determine the base flood elevation (BFE) for the site. If your community has BFE information for the site in either the profiles found in the FIS or the FIRM, you should determine the BFE for the proposed site from these sources.

If the applicant in Step 4 previously obtained a floodplain analysis/regulatory assessment performed by a licensed engineer from either a private firm or government agency for a letter of map revision

or amendment (LOMR/LOMA) or other purposes, use the BFE information obtained as “best available data”.

If the base flood elevation information is not available from the FIS profile or FIRM and not previously obtained, the applicant should utilize the services of a licensed surveyor or engineer to determine the base flood elevation (floodplain analysis/regulatory assessment) for the site.

Approximate methods described in FEMA 265 “*Managing Floodplain Development in Approximate Zone A Areas, A Guide for Obtaining and Developing Base Flood Elevations*” can be used also. In some cases, the applicant may need to supply surveyed cross sections and/or detailed topographic mapping to complete an analysis of the site. Proceed to Step 12.

## STEP 12

If the development is the placement of a new building having a floor area greater than 400 square feet\*, a substantial improvement made to an existing previously unaltered building, or a structural alteration made to a previously altered building, the Flood Resistant Construction requirements of the Virginia Uniform Statewide Building Code must be met.

Review the construction plans to make sure the building will be protected to the community’s flood protection elevation (FPE), which is either the base flood elevation or an elevation established in the flood protection ordinance that is above the base flood elevation. Protecting buildings to the FPE can be achieved by one of three methods:

- a. **Elevating on fill:** Check the plans to ensure that the top of the fill is at or above the FPE and meets all other requirements of Local, State, and Federal standards. Ensure that fill extends at least 10 feet beyond the foundation of the building before sloping below the FPE. The slopes should be no steeper than 3 horizontal to 1 vertical when using vegetative cover.
- b. **Elevating on posts piers, columns, an enclosure below the elevated structure, or other types of similar foundation:** Check the plans to ensure that:
  - the structure will be properly anchored to resist collapse or flotation;
  - materials used below the lowest floor are resistant to flood damage;
  - all electrical, heating, ventilating, plumbing, and air conditioning equipment and utility meters are located at or above the flood protection grade;
  - all water and sewer pipes, electrical and telephone lines located below the flood protection grade are waterproof; and,
  - if an enclosure is used, there must be permanent openings no higher than one foot above grade (openings of at least 1 square inch for every square foot of enclosed area subject to flooding).
- c. **Floodproofing: *This is only an option for non-residential buildings.*** A registered professional engineer must certify that the building has been designed so that below the flood protection grade, the structure and attendant utility facilities are watertight and capable of resisting the effects of the regulatory flood. The registered engineer must sign and certify a floodproofing certificate.

\* Some communities may be more restrictive.

Proceed to Step 13.

## **STEP 13**

Once you are assured that the proposed project satisfies all of the applicable Local, State, and Federal regulations pertaining to development/construction, approve and issue a permit. Be sure to maintain all appropriate documentation in the applicant's permit file for your records. If the requirements listed above are not met, deny the permit with a complete written explanation of ordinance specifications that are not met by proposed development. Applicant has a right to appeal BFE determinations or permit denials through the appropriate planning or zoning board. All reasons for appeals and variances, and findings of the appeals board should be included in the permit file. Have the applicant sign a statement acknowledging that he has been informed that the flooding risk may be greater and that insurance premiums will be based on the risk for any non-conforming structures. Proceed to Step 14.

## **STEP 14**

Perform a site inspection to ensure that the project is proceeding in accordance with the permitted plans. For new or substantially improved structures/buildings, obtain documentation of the as-built lowest floor elevations. Continue to perform site inspections as necessary during construction to ensure compliance with the floodplain ordinance and building code are maintained.

An Elevation Certificate from a registered land surveyor or registered professional engineer should be required during framing inspection. For flood-proofed, non-residential structures, a professional engineer must certify the flood-proofed elevation using a Flood-proofing Certificate (non-residential). V-Zone Certificates are required for V-Zone construction. A final inspection must be conducted to assure proper venting, no electrical, mechanical devices below BFE, anchoring of gas tanks, etc. Proceed to Step 15.

## **STEP 15**

Issue Occupancy Certificate only after all documentation is in file and final building inspection shows compliance with floodplain ordinance and building code. Continue to Step 16.

## **STEP 16**

**Maintain a record of all permit files and variances, both issued and denied.**

# APPENDIX D

## SAMPLE FLOODPLAIN DEVELOPMENT PERMIT APPLICATION AND REVIEW CHECKLIST

*Reference: Adapted from the Missouri Department of  
Emergency Management Floodplain Development  
Permit/Application*

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***Virginia Local Official's Guide to Floodplain Management***

## FLOODPLAIN DEVELOPMENT PERMIT/APPLICATION

Application No. \_\_\_\_\_

Date Issued: \_\_\_\_\_

**TO THE ADMINISTRATOR:** The undersigned hereby makes application for a permit to develop in a floodplain. The work to be performed, including flood protection works, is as described below and in attachments hereto. The undersigned agrees that all such work shall be in accordance with the requirements of the Floodplain Management Ordinance and with all other applicable county/city ordinances, federal programs, and the laws and regulations of the State of Missouri.

Owner or Agent \_\_\_\_\_

Date \_\_\_\_\_

Builder \_\_\_\_\_

Date \_\_\_\_\_

Address \_\_\_\_\_

Address \_\_\_\_\_

Phone \_\_\_\_\_

Phone \_\_\_\_\_

### SITE DATA

1. Location: \_\_\_\_\_  
Street Address: \_\_\_\_\_
2. Type of Development: Filling \_\_\_\_\_ Grading \_\_\_\_\_ Excavation \_\_\_\_\_ Minimum Improvement \_\_\_\_\_  
Routine Maintenance \_\_\_\_\_ Substantial Improvement \_\_\_\_\_ New Construction \_\_\_\_\_ Other \_\_\_\_\_
3. For Minimum or Substantial Improvements: Original Construction Date \_\_\_\_\_ Previous Addition(s) \_\_\_\_\_  
Existing Habitable Floor Area \_\_\_\_\_ sq. ft. Habitable Floor Area of Proposed Addition \_\_\_\_\_ sq. ft.
4. Description of Development: \_\_\_\_\_
5. Type of Structure: Residential ☐ Non-residential ☐
6. Premises: Structure Size \_\_\_\_\_ ft. By \_\_\_\_\_ ft. Area of Site \_\_\_\_\_ Sq Ft  
Principal Use \_\_\_\_\_ Accessory Uses (storage, parking, etc.) \_\_\_\_\_
7. Value of Improvement (fair market) \$ \_\_\_\_\_ Pre-Improvement/Assessed Value of Structure \$ \_\_\_\_\_
8. Property Located in a Designated FLOODWAY? Yes \_\_\_\_\_ No \_\_\_\_\_

**IF ANSWERED YES, CERTIFICATION MUST BE PROVIDED PRIOR TO THE ISSUANCE OF A PERMIT TO DEVELOP, THAT THE PROPOSED DEVELOPMENT WILL RESULT IN NO INCREASE IN THE BASE (100-YEAR) FLOOD ELEVATIONS.**

9. Property Located in a Designated Floodplain FRINGE? Yes \_\_\_\_\_ No \_\_\_\_\_
10. Elevation of the 100-Year Flood: \_\_\_\_\_ ft, NGVD Flood Source: \_\_\_\_\_
11. Elevations at the Proposed Site: Lowest Adjacent Grade \_\_\_\_\_ ft, NGVD Highest Adj. Grade \_\_\_\_\_ ft, NGVD
12. Local Ordinance Elevation/Floodproofing Requirement: \_\_\_\_\_ ft, NGVD
13. Other Floodplain Elevation Information (ID and describe source): \_\_\_\_\_  
\_\_\_\_\_
14. Are You Applying for a Floodplain Variance? Yes \_\_\_\_\_ No \_\_\_\_\_
15. Other Permits Required? Corps of Engineer 404 Permit: Yes \_\_\_\_\_ No \_\_\_\_\_ Provided \_\_\_\_\_  
Corps of Engineers/VMRC Joint Permit Application Yes \_\_\_\_\_ No \_\_\_\_\_ Provided \_\_\_\_\_  
State Erosion & Sediment Control Permit: Yes \_\_\_\_\_ No \_\_\_\_\_ Provided \_\_\_\_\_  
Environmental Protection Agency NPDES Permit: Yes \_\_\_\_\_ No \_\_\_\_\_ Provided \_\_\_\_\_

All provisions of Ordinance Number \_\_\_\_\_, of the "Floodplain Management Ordinance", shall be in compliance.

## **REQUIRED SUBMITTAL MATERIALS**

**All floodplain development permit applications must include the following:**

- ☐ Location map – Clearly show project location, all adjacent streets, subdivisions, etc.
- ☐ Development plan – Clearly show the 100-year floodplain, conveyance, and high hazard zone boundaries as they relate to the proposed project site.
- ☐ FEMA Elevation Certificate (FEMA Form 81-31)
- ☐ Complete detailed description of the proposed project including a discussion of the impacts to the floodplain as required by the *Floodplain Management Ordinance*.

**The following additional materials may also be required:**

- ☐ Engineering report completed and stamped by a licensed Colorado Professional Engineer which includes:
- ☐ Hydraulic Analysis (HEC-2 study, hard copy and disk copy)
- ☐ Structural analysis
- ☐ Determination that the proposed construction or development is in accordance with the City of Boulder Floodplain Regulations and that no rise in the water surface of a 100-year flood will occur due to the proposed construction or development.
- ☐ Flood proofing details
- ☐ Velocities of flood flows and flood depths across the property
- ☐ Other \_\_\_\_\_

### **OFFICIAL USE ONLY**

**PERMIT APPROVAL ☐ DENIAL ☐**

If Denied, Reason for Denial: \_\_\_\_\_

Plans and Specifications Approved/Denied this \_\_\_\_\_ Day of \_\_\_\_\_, 20\_\_

\_\_\_\_\_  
Signature of Developer/Owner

\_\_\_\_\_  
Authorizing Official

\_\_\_\_\_  
Print Name and Title

\_\_\_\_\_  
Print Name and Title

APPLICANT ACKNOWLEDGES THAT THE ISSUANCE OF THIS PERMIT IS CONTINGENT UPON THE ABOVE INFORMATION BEING CORRECT AND THAT THE PLANS AND SUPPORTING DATA HAVE BEEN OR SHALL BE PROVIDED AS REQUIRED. IN ADDITION, APPLICANT AGREES TO COMPLY WITH ALL APPLICABLE PROVISIONS OF THE LOCAL FLOODPLAIN MANAGEMENT ORDINANCE AND ALL OTHER LAWS OR ORDINANCES AFFECTING THE PROPOSED DEVELOPMENT.

THIS PERMIT IS ISSUED WITH THE CONDITION THAT THE LOWEST FLOOR (INCLUDING BASEMENT FLOOR) OF ANY NEW OR SUBSTANTIALLY IMPROVED RESIDENTIAL BUILDING WILL BE ELEVATED \_\_\_\_\_ FOOT/FEET ABOVE THE BASE FLOOD ELEVATION. IF THE PROPOSED DEVELOPMENT IS A NON-RESIDENTIAL BUILDING, THIS PERMIT IS ISSUED WITH THE CONDITION THAT THE LOWEST FLOOR (INCLUDING BASEMENT) OF A NEW OR SUBSTANTIALLY IMPROVED NON-RESIDENTIAL BUILDING WILL BE ELEVATED OR FLOODPROOFED \_\_\_\_\_ FOOT/FEET ABOVE THE BASE FLOOD ELEVATION.

THIS PERMIT IS USED WITH THE CONDITON THAT THE DEVELOPER/OWNER WILL PROVIDE CERTIFICATION BY A REGISTERED ENGINEER, ARCHITECT, OR LAND SURVEYOR OF THE "AS-BUILT" LOWEST FLOOR (INCLUDING BASEMENT) ELEVATION OF ANY NEW OR SUBSTANTIALLY IMPROVED BUILDING COVERED BY THIS PERMIT.

# **APPENDIX E**

## **DCR FLOODPLAIN MANAGEMENT FACT SHEETS**

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***Virginia Local Official's Guide to Floodplain Management***

# VIRGINIA'S FLOODPLAIN MANAGEMENT PROGRAM



Department of Conservation & Recreation

# Fact Sheet

## Fact Sheet No. 2

### *Preparing for a Flood*

If you live in a floodplain area there are many things you can do to prepare for the next flood that will save you time, money, or your life. Following is a partial list you can accomplish:

- Determine whether your property is in a floodplain or downstream of a dam. If it is determine the elevation of the property in relation to nearby streams and other waterways. This information is available from building inspectors/zoning administrators. If below a dam know the warning system for evacuation in the event of dam failure.
- Learn and practice the safest route from your home or business to high ground.
- Know where community evacuation shelters are located.
- Buy flood insurance and examine claim procedures.
- Itemize personal belongings to facilitate insurance claims.
- Install check or backup valves in building to prevent floodwater from backing up sewer lines
- Prepare an itemized list of personal items you will need if you must evacuate (medicines, prescriptions, clothing, special foods needed for infants, etc.).
- Keep important documents in a flood free safety deposit box.
- Monitor local radio and television stations for flood warnings.
- Make provisions for pets or livestock.
- 

#### When Flooding is Imminent

- Evacuate ASAP if living in a flash flood warning area.
- Elevate or move furniture to a higher floor.
- Fill and anchor tanks to keep them from floating away.
- Grease immovable machinery.
- Turn off electricity, gas, and water at main switch and valves. Label where these are located and teach responsible members of the family where they are located.
- Bring outside possessions inside the house, or tie them down securely.
- Keep gas tank in vehicle(s) at least half-full.
- Pack personal evacuation kit.
- If home will not be evacuated or not directly impacted by flood.
  - o Draw water and store in air tight containers
  - o Have a supply of non-perishable food on hand,
  - o Have flashlights with spare batteries, portable radio, first aid kit, fire extinguisher, and emergency cooking equipment in working order.

#### **DIVISION OF DAM SAFETY & FLOODPLAIN MANAGEMENT**

Phone: 804-371-6095

#### **FLOODPLAIN MANAGEMENT PROGRAM:**

- ✓ *Planning & Enforcement Assistance*
- ✓ *Flood Insurance*
- ✓ *Technical & Flood-proofing Assistance*
- ✓ *Cooperating Technical Partners*
- ✓ *Map Modernization & Prioritization*
- ✓ *Substantial Damages & Increased Cost of Compliance*
- ✓ *Community Rating System*
- ✓ *No Adverse Impact*
- ✓ *Workshops*

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DCR Floodplain Mgt. Program  
[www.state.va.us/dcr/sw/floodpln.htm](http://www.state.va.us/dcr/sw/floodpln.htm)



# VIRGINIA'S FLOODPLAIN MANAGEMENT PROGRAM

## ***Fact Sheet No. 2 (continued)*** ***Preparing for a Flood***

### **DURING FLOOD CONDITIONS**

It is essential to understand that floods are hazardous. The peril is no less if your neighborhood is covered with a foot, or under twelve feet of water.

#### **Things to do include:**

- The safety of your family is the most important consideration since floodwaters can rise rapidly. Keep the family together so you can evacuate if necessary.
- If evacuation appears necessary, turn all utilities at the main switch and close the main gas valve. Secure your home before leaving.
- If car stalls in a flooded area abandon it as soon as possible. Floodwaters can rise rapidly and sweep a car (and its occupants) away.
- Listen to radio for information of flood conditions.
- Follow instructions of emergency personnel.
- Keep children out of flood waters (no playing therein.)
- Watch out for fallen electrical wires, open manholes, etc.
- Be sensitive to the emotional condition of family members.
- Make plans for recovery.

#### **Things not to do:**

- Use foods that have come in contact with floodwater.
- Cross a flowing stream where water is above your knees.
- Drive where floodwater is extensive over the roads. Parts of the road may be washed out.
- Play or wade flooded streets.
- Operate electrical equipment in floodwater.
- Panic

### **WHAT TO DO AFTER A FLOOD**

When returning to a flooded home or business, focus on personal safety, building hazards, cleanup, and mitigation.

#### **Person Safety**

- Get a tetanus shot. Wear protective gloves and boots. No wading.
- Find out water contamination level and take necessary precautions.
- Look out for "critters" like snakes. Use a stick to lift debris.
- Don't overexert. Many deaths due to flooding occur during cleanup.
- Don't use electrical appliances until cleaned and repaired.
- Don't underestimate emotional stress. Use counseling resources.
- Have children stay out of flooded area.
- Salvage only canned foods and even then exercise extreme care.



# VIRGINIA'S FLOODPLAIN MANAGEMENT PROGRAM

## *Fact Sheet No. 2 (continued)* *Preparing for a Flood*

### **Building Hazards**

- Contact local official for permission to reoccupy flooded building.
- Make sure gas is turned off and don't light matches until then.
- Make sure electricity is turned off.
- Do not pump basement water all at once. Groundwater pressure against walls may cause them to collapse. Pump over several days.
- Report loose power lines to Power Company.
- Schedule appointment with insurance agent A.S.A.P.

### **Cleanup and Salvage**

Prioritized cleanup tasks. .

#### High priorities

- Store damaged contents on premises for adjuster to inspect
- Heating and cooling system components must be cleaned and. Do not operate until inspected by certified technician.
- Open up doors and windows for circulation of air.
- Store valuable papers, works of art, paintings, etc. in cold storage to prevent mildew until they can be restored by an expert.
- Dry books by opening them and standing on end.
- Wooden furniture may warp if dried in direct sunlight. Dry in shade.
- Clean metal A.S.A.P. After dried, wipe with an oiled cloth.

#### Medium Priorities

- Let wooden floors dry naturally to curtail cracking and splitting
- Drill hole in wall near floor between studs to drain water.
- Wash with detergent or sanitizing solution (One or two tablespoons of laundry bleach to 1 gallon of water at room temperature.)
- If burners and other motors are to be salvaged seek guidance from Certified technician. Hose down sediment.

#### Low priorities

- Shovel and hose down sediment while wet.
- Wash upholstered furniture.
- Clean rugs thoroughly then lay out to dry. Consider professional.
- Mattresses, pillows and stuffed furniture may be a lost cause.

### **Mitigation**

Steps to be taken to avoid a repeat of flooding devastation.

- Elevate building above flood level on pilings or fill.
- Elevate furnace and utilities above flood level.
- Install flood proofing devices such as "flood shields" across doors
- Store keepsakes in watertight container or above flood level.
- Install check valves in sewer line and buy sewer backup insurance.
- Relocate structure out of floodplain.
- Buy flood insurance.





# Fact Sheet

## ***Fact Sheet No. 4*** ***Effects of Non-Compliance in the*** ***National Flood Insurance Program***

### **A. Effects of Non-Compliance on a Community:**

1. The National Flood Insurance Program (NFIP) enables property owners in participating communities to insure themselves against flood losses. By employing wise floodplain management, a participating community can protect its citizens against much of the devastating financial loss resulting from flood disasters. Prudent local management of development in the floodplains results in construction practices that can reduce flood losses and the high costs associated with flood disasters to all levels of government.
2. If a community fails to enforce its local floodplain management ordinance and the flood resistant construction provisions of the Virginia Uniform Statewide Building Code (VUSBC), it will likely result in non-compliant development within the FEMA designated flood hazard area (a.k.a. the 100-year floodplain). A community may be placed on probation if the non-compliant development appears willful by local officials or an endemic part of the local program.
3. Probation will last until all program deficiencies have been corrected and violations remedied to the maximum extent possible. In addition, a \$50 surcharge will be placed on all flood insurance policies in the community for at least one year. If a community doesn't address its NFIP violations within in a period specified by FEMA, the community may be suspended from the NFIP. See DCR Fact Sheet No. 5 for details of Probation and Suspension.
4. Non-compliant development within the FEMA designated flood hazard area results in violations of the NFIP regulations. Some common violations include:
  - a. Failure to adopt a floodplain management ordinance that meets the minimum requirements of the NFIP regulations. Suspension can result upon failure to update its floodplain management ordinance by the new effective date when its flood hazard maps are updated.
  - b. Failure to enforce all the provisions of the local floodplain management ordinance including:
    - (1) Require permits and a review process for permits for all proposed construction in FEMA designated flood hazard areas;
    - (2) Determine whether new building sites will be reasonably safe from flooding;
    - (3) Ensure that new construction and substantial improvements are adequately anchored to prevent flotation, collapse or lateral movement of structure resulting from hydrostatic and hydrodynamic forces;

### **DIVISION OF DAM SAFETY & FLOODPLAIN MANAGEMENT**

Phone: 804-371-6095

### **FLOODPLAIN MANAGEMENT PROGRAM:**

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DCR Floodplain Mgt. Program  
[www.state.va.us/dcr/sw/floodpln.htm](http://www.state.va.us/dcr/sw/floodpln.htm)



# VIRGINIA'S FLOODPLAIN MANAGEMENT PROGRAM

## Fact Sheet No. 4 (pg. 2)

### *Effects of Non-Compliance in the National Flood Insurance Program*

#### **A. Effects on a Community (continued)**

##### **4. Common violations (cont'd)**

##### **b. Failure to enforce floodplain ordinance provisions including:**

- (4) Ensure that materials below the base flood elevation are flood resistant;
- (5) Ensure that methods and practices used to construct will minimize flood damages;
- (6) Within flood-prone areas, ensure that heating, electrical, ventilation, plumbing and air conditioning equipment and other service facilities are designed and/or located to prevent water from entering or accumulating within the components during flood conditions;
- (7) Within flood-prone areas, require all water supply and sanitary sewer systems to be designed to minimize or eliminate infiltration of flood waters into the systems or discharges from the systems into flood waters;
- (8) Within FEMA designated flood hazard areas (SFHAs), require base flood elevation (BFE) data to be established where it is currently not available;
- (9) Within flood hazard areas where flood elevation data is available, obtain the elevation of the lowest floor, obtain the elevation to which the structure has been flood-proofed (if it has been properly flood-proofed), and maintain the records of all such records indefinitely with the local floodplain manager;
- (10) Maintain the carrying capacity for the 100-yr discharge within altered or relocated portions of any watercourse;
- (11) Require all new construction and substantial improvements of residential structures within SFHAs to have the lowest floor elevated to or above the BFE;
- (12) Non-residential structures shall either (i) have the lowest floor elevated to or above the BFE or (ii) be designed so that the structure below the BFE is watertight with walls substantially impermeable to the passage of water and with structural components having the capability of resisting hydrostatic and hydrodynamic loads attributable to flood waters;
- (13) Non-residential structures that are intended to be watertight below the BFE shall be certified by a registered professional engineer or architect and the records of such certifications maintained for the duration of the structure;
- (14) For new construction or substantial improvements within the SFHA, require that fully enclosed areas below the lowest floor are usable solely for parking of vehicles, building access, or storage shall be designed to automatically equalize hydrostatic flood forces on exterior walls by allowing the entry and exit of flood waters;
- (15) Until a floodway is designated, no development shall be permitted within the SFHA without demonstrating that the cumulative effect of the proposed development combined with all other development will not cause a rise of more than one foot within the SFHA at any point in the community;
- (16) Once a regulatory floodway is adopted, prohibit encroachments (including fill) within that area unless it has been demonstrated that there will not be any increase in flood levels resulting from that encroachment;
- (17) In coastal high hazard zones, ensure that new construction and substantial improvements be elevated on piles or columns so that the lowest horizontal structural member is elevated to or above the BFE and be anchored to resist flotation, collapse, and lateral movement;



# VIRGINIA'S FLOODPLAIN MANAGEMENT PROGRAM

## Fact Sheet No. 4 (pg. 3)

### *Effects of Non-Compliance in the National Flood Insurance Program*

#### **A. Effects on a Community (continued)**

4. Common violations (cont'd)
  - b. Failure to enforce floodplain ordinance provisions including:
    - (18) In coastal high hazard zones ensure that the space below the lowest floor is either free of obstruction or constructed with non-supporting breakaway walls, open wood lattice-work, or insect screening intended collapse under wind and water loads without causing collapse, displacement, or other structural damage to the elevated portion of the structure.
5. If a community is participating in the Community Rating System, their ranking can either be reduced or they may be completely removed from CRS and the benefits of lower insurance premiums cancelled.
6. If flood damages have occurred, claims have been paid, and all or part of the damage can be attributed to acts or omissions of the community, the Federal Emergency Management Agency's (FEMA) General Counsel Office may proceed with subrogation actions against the community.
7. If it appears that a community is ignoring violations or granting unwarranted variances, FEMA may request that the Federal Insurance Administration field verify all or part of the structures within a community. If the structure were improperly rated earlier, this could lead to increased costs to individuals for flood insurance (see flood insurance example).



# VIRGINIA'S FLOODPLAIN MANAGEMENT PROGRAM

## Fact Sheet No. 4 (pg. 4)

### *Effects of Non-Compliance in the National Flood Insurance Program*

#### **B. Effects on Individual Structures**

1. If an individual structure is found to be in violation of federal, state or local floodplain management regulations, flood insurance coverage may be denied. This would have the same effect on an individual structure as the effects listed in A. 2. above.
2. If an individual structure is found not to be in compliance with the local ordinance, it may be re-rated, using the actual elevation for the lowest floor (including basement).
3. If a structure is misrated due to fraudulent or willful concealment or misrepresentation of facts by the policyholder or his agent, claims may be denied and back premiums may be collected during claims adjustment.
4. If claims have been paid and damage can be attributed to acts or omissions of the individual, subrogation actions may be brought by the FEMA Office of General Counsel.

#### Example of Elevation Non-Compliance

Flood Insurance rates for \$80,000 structural coverage on a single family dwelling with no basement and \$30,000 contents coverage based on elevation of the lowest floor above or below the Base Flood Elevation.

+ 2 ft.	\$93.00 structure +	\$45.00 contents +	\$70.00 contents =	\$208.00
+ 1 ft.	\$115.50 structure +	\$64.50 contents +	\$70.00 contents =	\$250.00
0 ft.	\$169.50 structure +	\$115.50 contents +	\$70.00 contents =	\$355.00
- 1 ft.	\$562.00 structure +	\$397.50 contents +	\$70.00 contents =	\$1029.50
- 2 ft	any policy at an elevation of 2' or greater below the base flood elevation must be submitted to Washington to be rated at actuarial rates and may exceed \$1,250.00			

Above rates are examples that may vary slightly based on a setting of new rates, etc.



# VIRGINIA'S FLOODPLAIN MANAGEMENT PROGRAM



Department of Conservation & Recreation

# Fact Sheet

## ***Fact Sheet No. 5 Probation and Suspension from the National Flood Insurance Program***

### **A. What happens when a community does not enforce its floodplain management ordinance?**

1. Communities are required to adopt and enforce a floodplain management ordinance that meets minimum NFIP requirements. Communities that do not enforce these ordinances can be placed on probation or suspended from the program. This is done only after FEMA and the State NFIP Coordinator have provided assistance to the community to help it become compliant.
2. If a community fails to enforce its local ordinance it may be placed on probation until all program deficiencies have been corrected and violations remedied to the maximum extent possible. In addition, a \$50 surcharge will be placed on all flood insurance policies in the community for at least one year.

### **B. What is probation from the NFIP and its impact on a community?**

1. Probation is the formal notification by FEMA to a community that its floodplain management program does not meet NFIP criteria. It is an action authorized under Federal regulations.
2. A community can be placed on probation 90 days after FEMA provides written notice to community officials of specific deficiencies. Probation generally is imposed only after FEMA has consulted with the community and has not been able to resolve deficiencies. The FEMA Regional Director has the authority to place communities on probation.
3. After notification is given to a community, probation becomes effective unless local officials take the necessary steps to correct the program deficiencies, remedy the violations, and demonstrate effective implementation of the local ordinance in support of the NFIP requirements.
4. Probation may be continued for up to 1 year after the community corrects all Program deficiencies and remedies all violations to the maximum extent possible.
5. The \$50 surcharge that is added to the premium for each policy sold or renewed in the community is intended to focus the attention of policyholders on the community's non-compliance to help avoid suspension of the community, which has serious adverse impacts on those policyholders. Probation does not affect the availability of flood insurance.

### **C. What is suspension from the NFIP and its impact on a community?**

1. Suspension of a participating community (usually after a period of probation) occurs when the community fails to solve its compliance problems or fails to adopt an adequate ordinance. The community is provided written notice of the impending suspension and granted 30 days in which to show cause why it should not be suspended.

#### **DIVISION OF DAM SAFETY & FLOODPLAIN MANAGEMENT**

Phone: 804-371-6095

#### **FLOODPLAIN MANAGEMENT PROGRAM:**

- ✓ *Planning & Enforcement Assistance*
- ✓ *Flood Insurance*
- ✓ *Technical & Flood-proofing Assistance*
- ✓ *Cooperating Technical Partners*
- ✓ *Map Modernization & Prioritization*
- ✓ *Substantial Damages & Increased Cost of Compliance*
- ✓ *Community Rating System*
- ✓ *No Adverse Impact*
- ✓ *Workshops*

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DCR Floodplain Mgt. Program  
[www.state.va.us/dcr/sw/floodpln.htm](http://www.state.va.us/dcr/sw/floodpln.htm)



# VIRGINIA'S FLOODPLAIN MANAGEMENT PROGRAM

## *Fact Sheet No. 5 (continued)*

### *Probation and Suspension from the National Flood Insurance Program*

#### **C. What is suspension from the NFIP and its impact on a community? (cont'd)**

2. Policies in force at the time of suspension continue in force for the policy term. Three-year policies remain in force until the next annual anniversary date of the policy.
3. Suspension is imposed by the Associate Director, Mitigation Directorate, FEMA. If suspended, the community becomes non-participating and flood insurance policies cannot be written or renewed.
4. Suspension from the program would mean that people living in the community would not be able to purchase flood insurance and federal agencies would be prohibited from making grants, loans or loan guarantees for properties in the flood hazard area. Furthermore, if a flood disaster occurs, certain types of federal disaster assistance would not be available.
5. If a community fails to take remedial measures, it may be suspended from the National Flood Insurance Program which will have the following effects on the community:
  - a. Flood insurance is not available on buildings located within non-participating or suspended communities. No owner of a residence, business or public building will be able to purchase a flood insurance policy.
  - b. Federal grants, loans, or loan guarantees are prohibited for buildings located in identified flood hazard areas. Includes all Federal agencies such as HUD, EPA, SBA, HHS, DOT, DOE, etc.
  - c. Certain types of Federal disaster assistance would not be available for victims in identified flood hazard areas, particularly if flood insurance is a condition of the assistance (i.e. disaster recovery loans and grants).
  - d. No Federal mortgage insurance may be provided in identified flood hazard areas. This includes FHAM, VA, SBA and FNMA.
  - e. Actuarial rates go into effect regardless of whether or not a community participates in the program. Unprotected construction today may be prohibitively expensive to insure should the community later re-enter the program.
  - f. Local governing body may be susceptible to some form of liability by not participating because their action: (1) denies the ability of its citizens to purchase flood insurance, and (2) does not take positive steps to reduce the exposure of life and property in the face of authoritative scientific and technical data.
  - g. Legislative changes to FDPA (Flood Disaster Protection Act) restriction on conventional loans in non-participating communities replaced by requirement that lenders:
    - (1) must notify buyer or lessee that property is in flood area, and
    - (2) must notify buyer or lessee that property in flood hazard area is not eligible for Federal disaster relief in a declared disaster.



# VIRGINIA'S FLOODPLAIN MANAGEMENT PROGRAM



Department of Conservation & Recreation

# Fact Sheet

## Fact Sheet No. 8

### *Letters of Map Change*

The Federal Emergency Management Agency (FEMA) recognizes that Flood Insurance Studies (FISs) may require revision due to new information becoming available or through physical changes in flood plains. Letters of Map Change include Letters of Map Amendment (LOMA), Letters of Map Revision (LOMR)

LOMAs issued under 44 CFR Part 70 of the NFIP regulations indicates whether or not a structure(s) or proposed structure(s) is located in a Special Flood Hazard Area (SFHA) as shown on a Flood Insurance Rate Map (FIRM) or Flood Hazard Boundary Map (FHBMA). A LOMA removes a property from the SFHA and thereby makes inapplicable the Federal requirement for the purchase of flood insurance. A LOMA will only be issued if the elevations of the parcel of land or if the grounds surrounding the structure(s) have not been altered by fill placed since the effective date of the first NFIP map designating the SFHA.

LOMRs can be issued under 44 CFR Part 65 of the NFIP regulations as an expeditious means of revising a FIRM or Flood Boundary Floodway Map (FBFM). The issuance of a LOMR involving fill will result in the removal of the parcel of land or structures from the SFHA and relief from the federal insurance requirement. The LOMR gives a detailed description of the Base Flood Elevation (BFE) and graphic changes that will be made to the SFHA currently delineated on the effective FIRM or FBFM. LOMRs involving BFE changes are always succeeded by a physical map revision. All requests for a LOMR-F involving fill must be supported by sufficient technical data to demonstrate that the entire area within the legal bounds of a parcel of land or the structures have been elevated by fill to or above the BFE and are not subject to inundation by the base flood. For structures, it must be demonstrated that both the lowest floor (including basement) and the lowest finished grade adjacent to the structure have been elevated by fill to above the BFE.

For more information regarding LOMAs or LOMRs refer to FEMA Manual FIA-12, Appeals, Revisions and Amendments to Flood Insurance Rate Maps—A Guide for Community Officials.

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DCR Floodplain Mgt. Program  
[www.state.va.us/dcr/sw/floodpln.htm](http://www.state.va.us/dcr/sw/floodpln.htm)



# **APPENDIX F**

## **FEMA TECHNICAL BULLETINS**

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***Virginia Local Official's Guide to Floodplain Management***

# FEMA TECHNICAL BULLETINS

## Brief Overview

The Technical Bulletins provide guidance concerning the building performance standards of the NFIP, which are contained in Title 44 of the U.S. Code of Federal Regulations at Section 60.3. The bulletins are intended for use primarily by state and local officials responsible for interpreting and enforcing NFIP regulations and by members of the development community, such as design professionals and builders. New bulletins, as well as updates of existing bulletins, are issued periodically, as necessary. The bulletins do not create regulation; rather, they provide specific guidance for complying with the minimum requirements of existing NFIP regulations. Users of the Technical Bulletins who need additional guidance concerning NFIP regulatory requirements should contact the appropriate FEMA Regional Office

Technical Bulletins provide guidance on the minimum requirements of the NFIP regulations. Community or State requirements that exceed those of the NFIP take precedence. Design professionals should contact the community to determine whether more restrictive local or State regulations apply to the building or site in question. All applicable standards of the State or local building code must also be met for any building in a flood hazard area.

Copies of the Technical Bulletins can be obtained from the FEMA Regional Office that serves your area (see below). In addition, Technical Bulletins and other FEMA publications can be ordered from the FEMA Publications Service Center at 1-800-480-2520. The Technical Bulletins are also available at the FEMA web site at [www.fema.gov/fima/techbul.shtm](http://www.fema.gov/fima/techbul.shtm).

Region III Mitigation Division  
One Independence Mall  
615 Chestnut Street, Sixth Floor  
Philadelphia, PA 19106-4404  
(215) 931-5621

## Available Technical Bulletins

### 1-93 Openings in Foundation Walls

Provides guidance on the NFIP regulations concerning the requirement for openings in below-Base Flood Elevation (BFE) foundation walls for buildings located in Zones A, AE, A1, A30, AR, AO, and AH.

### 2-93 Flood-Resistant Materials Requirements

Provides guidance on the NFIP regulations concerning the required use of flood-damage resistant construction materials for building components located below the BFE in Special Flood Hazard Areas (SFHAs)—both A zones and V zones.

### 3-93 Non-Residential Flood-proofing – Requirements and Certification

Provides guidance on the NFIP regulations concerning watertight construction and the required certification for flood-proofed non-residential buildings in Zones A, AE, A1-A30, AR, AO, and AH whose lowest floors are below the BFE.

### 4-93 Elevator Installation

Provides guidance on the NFIP regulations concerning the installation of elevators below the BFE in SFHAs—both A and V zones.

### **5-93 Free-of-Obstruction Requirements**

Provides guidance on the NFIP regulations concerning obstructions to flood waters below elevated buildings and on building sites in Coastal High Hazard Areas (Zones V, VE, and V1-V30).

### **6-93 Below-Grade Parking Requirements**

Provides guidance on the NFIP regulations concerning the design of below-grade parking garages beneath buildings located in Zones A, AE, A1-A30, AR, AO, and AH.

### **7-93 Wet Flood-proofing Requirements**

Provides guidance on the NFIP regulations concerning wet flood-proofing of certain types of structures located in Zones A, AE, A1-A30, AR, AO, and AH.

### **8-96 Corrosion Protection for Metal Connectors in Coastal Areas**

Provides guidance on the need for, selection of, and use of corrosion-resistant metal connectors for the construction of buildings in coastal areas.

### **9-99 Design and Construction Guidance for Breakaway Walls Below Elevated Buildings in Coastal Areas**

Provides prescriptive criteria for the design and construction of wood-frame and masonry breakaway walls compliant with NFIP regulatory requirements.

### **10-01 Ensuring That Structures Built on Fill In or Near Special Flood Hazard Areas Are Reasonably Safe From Flooding**

Provides regulatory and technical guidance concerning the construction of buildings with various types of foundations, including basements, in areas removed from the SFHA through the placement of fill and in areas near the SFHA.

### **11-01 Crawlspace Construction for Buildings Located in Special Flood Hazard Areas**

Provides interim guidance on minimum NFIP requirements as well as best practices for crawlspace construction in the Special Flood Hazard Area.

## **Key Word/Subject Index**

This index is designed to allow the user to quickly locate key words that pertain to the subject in question. The index also cross-references issues that are addressed by more than one Technical Bulletin.

### **Technical Bulletin**

### **Key Words and Subjects**

3	A-zone flood-proofing
5	accessory buildings, as possible obstructions in V zones
5	accessory buildings, low value and small, defined
7	accessory structures
7	agricultural structures
10	basement construction, engineered option
10	basement construction, simplified approach
1	basement, definition of
10	basement foundation in fill, not recommended
10	basement foundation in fill, vulnerability to subsurface flooding

10	basement foundation, in fill placed above the BFE
10	basement foundation, with lowest floor at or above BFE
10	basement foundation, with lowest opening above BFE
10	basement foundation, with lowest opening at BFE
6	below-grade parking garage, considered a basement
6	below-grade parking garage, defined
6	below-grade parking in A and V zones, when allowed, requirements for
9	breakaway wall, failure modes
9	breakaway wall, insurance considerations
2, 9	breakaway wall materials in V zones, made of flood-resistant materials
9	breakaway wall, NFIP regulatory requirements
9	breakaway wall, specifications for NFIP-compliant construction
9	breaking wave, impact on vertical surface
5	bulkheads, as possible obstructions in V zones
10	community permitting, administrative options for
8	corrosion, classes of building exposure to
8	corrosion, causes of
8	corrosion, identifying high-risk buildings
8	corrosion, planning for
8	corrosion-resistant materials for sheet metal connectors
10	crawlspace foundation
5	decks and patios, as possible obstructions in V zones
5	detached garages, elevation requirement for in V zones
10	earthen fill, placed to remove land from the SFHA
10	earthen fill, zones where prohibited
4	elevators, types of
4	elevator components, location of in relation to Base Flood Elevation
4	elevator electrical equipment, location of in relation to Base Flood Elevation
10	fill, areas where prohibited
5	fill, as obstruction beneath buildings in V zones
10	fill, proper placement of
4	float switch, use of in flood areas (for elevator cab)
4	flood-resistant elevator components, use of
2	flood-resistant flooring materials
2	flood-resistant material, classifications, use of
2	flood-resistant material, definition of
2	flood-resistant wall and ceiling materials
3	flood-proofing certificate, non-residential
6	flood-proofing, below-grade parking beneath non-residential buildings, design requirements for
3	flood-proofing, Emergency Operations Plan, minimum acceptable
3	flood-proofing, Inspection and Maintenance Plan
3,6	flood-proofing, recognition of for insurance rating purposes
5	foundation bracing, as possible obstructions in V zones
10	foundation flood risk, summary table
1	foundations in A zones
1	foundation openings in A zones, size, how to calculate
1	foundation vents in A zones
5	free of obstruction, definition of
5	free of obstruction, designing a foundation system in V zones
5	free of obstruction requirements in V zones
10	freeboard, recommendations
7	functionally dependent use

8	galvanizing
1	garage doors, to meet the openings requirement
7	garages, attached to non-residential structure
1, 7	garages, attached to residential buildings
7	garages, detached from structure
5	grade beams, as possible obstructions in V zones
3	high hazard area, safety and access in
7	historic buildings
3	hydrodynamic forces on flood-proofed building
3	hydrostatic forces on flood-proofed building
1	hydrostatic pressure, automatically equalized
1	hydrostatic pressure, how to calculate
9	insect screening, for below building enclosures
2	insect screening in V zones, made of flood-resistant materials
10	insurance coverage for basement flooding, restrictions
9	latticework, for below-building enclosures
2	latticework in V zones, made of flood-resistant materials
3	lowest floor, definition of
3	non-residential flood-proofing certificate, how to fill out
1	openings for foundations in A zones
10	professional certification
10	professional certification, sample form
10	"reasonably safe from flooding," defined
10	"reasonably safe from flooding," NFIP regulations concerning
1	safety factor for foundation openings
8	salt spray from breaking waves
10	slab-on-grade foundation
10	stem wall foundation
10	sump pump, requirements for simplified basement construction
5	swimming pools, beneath buildings in V zones
1	substantial damage, foundation wall openings requirement
1	substantial improvement, foundation wall openings requirement
2	U.S. Army Corps of Engineers, <i>Flood Proofing Regulations</i>
7	variances from NFIP requirements
7	variances, issuance in designated floodways
7	wet flood-proofing, definition of
7	wet flood-proofing, engineering considerations
7	wet flood-proofing, flood insurance implications
7	wet flood-proofing, planning considerations

# APPENDIX G

## SAMPLE MODEL FLOODPLAIN DEVELOPMENT VARIANCE AND APPEAL RECORD

*Reference: Adapted from the Indiana Department of  
Natural Resources, Division of Water's "Local Floodplain  
Administrator's Guide" for Virginia*

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***Virginia Local Official's Guide to Floodplain Management***

## MODEL FLOODPLAIN VARIANCE AND APPEAL RECORD FOR VIRGINIA

**A variance is a grant of relief given by a community from the terms of specific standards required in its floodplain regulations. The issuance of a variance is for floodplain management purposes only. Insurance premium rates are determined by the federal government according to actuarial risk and will not be modified by the granting of a variance. ANY VARIANCE GRANTED BY A COMMUNITY MUST BE CONSISTENT WITH THE NFIP GUIDELINES AND WITH STATE AND LOCAL LAW.**

Name of Applicant: \_\_\_\_\_

Property Address: \_\_\_\_\_

Type of structure and intended use: \_\_\_\_\_

---

### **1. Floodplain Status (check which one applies)**

Floodway \_\_\_\_\_

(Note: no variances for the construction of new residences in the floodway are allowed that are not in accordance with IC 14-28-1)

Floodway Fringe \_\_\_\_\_

The variance applicant must meet all criteria under Ordinance (Resolution) No. \_\_\_\_\_, IC 14-28-1, 60.6(a) of the Code of Federal Regulations (CFR), and in accordance with 60.3(d)(3) CFR, demonstrate that no increase in flood stages will result. If the applicant cannot meet all of the aforementioned codes and regulations, then do not grant the variance.

### **2. Has the applicant shown that there exists a good and sufficient cause for the requested variance?**

Yes\* \_\_\_\_\_ (continue on to next question)

No \_\_\_\_\_ (variance should not be granted)

\*A variance request by an applicant that is based on good and sufficient cause is one that solely deals with the physical characteristics of the property, subdivision lot, or land parcel under question. For further explanation, please refer to the FEMA Variance Guidelines.

Please state what the good and sufficient cause is: \_\_\_\_\_

---

### **3. Has the applicant shown that the strict application of the terms of the Floodplain Management Ordinance will constitute an exceptional hardship?**

Yes\* \_\_\_\_\_ (continue on to next question)

No \_\_\_\_\_ (variance should not be granted)

\*The hardship that would result from failure to grant a requested variance must be exceptional, unusual, and peculiar to the property involved. Economic or financial hardship, inconvenience, aesthetic considerations, physical handicaps, personal preferences, the disapproval of one's neighbors, or homeowners association restrictions likewise cannot, as a rule, qualify as exceptional hardship. For further explanation, please refer to FEMA Variance Guidelines.

Please state what the exceptional hardship is: \_\_\_\_\_

---

4. *Has the applicant shown that the approval of the requested variance will not increase flood heights, create additional threats to public safety, cause additional public expense, create nuisances, cause fraud or victimization of the public or conflict with existing laws or ordinances?*

Yes \_\_\_\_\_

No \_\_\_\_\_ (*variance should not be granted*)

\*Please refer to the FEMA Variance Guidelines before answering this question. Please state why the approval of the variance would not cause the occurrence of the aforementioned items in question #4:

---

---

**If the proposed construction meets the requirements of question #1, and questions #2, #3, and #4 were all answered “yes”, then the body of government responsible for granting appeals may issue a variance to the terms and provisions of Floodplain Management Ordinance subject to the following standards and conditions:**

(Please refer to the FEMA Variance Guidelines for assistance in meeting the following standards and conditions.)

*1. If the requested variance is an exception to the flood protection elevation requirements, the lot should be one-half acre or less in size and contiguous to and surrounded by lots with existing structures constructed below the flood protection elevation.*

(Reminder: If the lot is greater than one-half acre in size, applicant must submit technical justification. Please attach justification.)

*2. If the requested variance or exception is for the construction of a structure listed on the National Register of Historic Places or the State Historic Register, please attach a letter or appropriate documentation from either agency that shows that the structure is a historic building.*

*3. Variances are issued only to give the minimum relief necessary. Please describe what the applicant is required to do in order to provide the maximum practical flood protection. (i.e., raise all utilities to or above the base flood elevation, use flood resistant materials, and use watertight sealant)* \_\_\_\_\_

---

*4. The appointed body of government needs to issue a written notice to the petitioner of the variance or exception that the proposed construction will be subject to increased risks to life and property and could require payment of excessive flood premiums (Up to \$25 per \$100 for structural coverage). Please attach a copy of this notice.*

**AN APPLICANT RECEIVING A VARIANCE TO BUILD A STRUCTURE WITH THE LOWEST FLOOR ELEVATION BELOW THE BASE FLOOD ELEVATION (100-YEAR) IS HEREBY NOTIFIED THAT THE REDUCED FLOOR ELEVATION WILL RESULT IN INCREASED PREMIUM RATES FOR FLOOD INSURANCE UP TO AMOUNTS AS HIGH AS \$25 PER \$100 OF INSURANCE COVERAGE. CONSTRUCTION BELOW THE BASE FLOOD LEVEL INCREASES RISKS TO LIFE AND PROPERTY.**

---

*Applicant's Signature*

---

*Date*

---

*Administrator's Signature*

---

*Date*

---

## **RECORD OF VARIANCE ACTIONS**

Variance request submitted to \_\_\_\_\_ on \_\_\_\_\_ (date) \_\_\_\_\_

In accordance with the criteria and guidelines of the floodplain regulations in the Floodplain Management Ordinance, the \_\_\_\_\_ (appeal board)  
\_\_\_\_\_ (community name) hereby approves [ ☐ ], denies [ ☐ ] the above request for variance.

By: \_\_\_\_\_ (Signature) \_\_\_\_\_,

Title: \_\_\_\_\_ Date: \_\_\_\_\_

Decisions (vote) of the board: \_\_\_\_\_

Special provisions of Variance Approval: \_\_\_\_\_

***Note: As provided in \_\_\_\_\_, those aggrieved by the decision of the appeal board may appeal such decisions to the \_\_\_\_\_.***

## **FEMA Variance Guidelines**

### **April 1998**

#### **INTRODUCTION**

The Federal Emergency Management Agency (FEMA) does not set forth absolute criteria for granting variances from the floodplain management provisions of Title 44 CFR, §60.3, §60.4, and §60.5. However, general variance criteria have been established in the NFIP regulations under §60.6 (a). These criteria provide the basis for each community participating in the NFIP to determine if a structure qualifies for a variance from the local floodplain management regulations. The variance criteria are a compilation of standards most frequently found in State variance law, coupled with specific floodplain management standards.

In all cases, the responsibility to approve or disapprove a variance rests on the community, not FEMA. However, FEMA evaluates variances granted by a community to determine if they are consistent with the objective of sound floodplain management. The variance criteria are intended to inform participating communities of the guidelines that FEMA will use in such an evaluation.

To ensure consistency with sound floodplain management, communities should issue variances only on a finding of good and sufficient cause, exceptional hardship, and a determination that variance will not result in additional threats to public safety, extraordinary public expense, create nuisances, cause fraud on or victimization of the public, or conflict with existing local laws or ordinances. In addition, a variance should be the minimum necessary, considering the flood hazard, to afford relief.

If the criteria at §60.6 (a) are closely adhered to, variances that completely waive the substantive NFIP requirements which provide protection to the 100-year standard should be quite rare. In most cases some lower level of protection or alternative methods to provide comparable protection will be available.

#### **DESCRIPTION AND INTENT OF THE REGULATIONS COVERING VARIANCES**

The NFIP variance criteria are based on the general principal of zoning law that variances pertain to a piece of property and are not personal in nature. Though standards vary among States, in general a properly issued variance is granted for a parcel of property with physical characteristics so unusual that complying with the ordinance would create an exceptional hardship to the applicant or the surrounding property owners. Those characteristics must be unique to that property and not be shared by adjacent parcels. The unique characteristics must pertain to the land itself, not to the structure, its inhabitants or the property owners. Therefore, financial hardship or the health condition of the property owner alone are never sufficient causes for granting a variance.

It is common practice for some administrative bodies to grant variances for zoning, property setback, and nonhealth and safety regulations based on personal criteria and the character of the owner rather than the nature of the property. However, granting a variance from NFIP floodplain management standards on these grounds would rarely be an appropriate action. Such action, would not be consistent with the community's need to ensure public safety.

Once the character of the owner changes (i.e., the property is sold, leased, etc.) the justification for a variance based on personal considerations no longer exists. Because the structure remains, future owner/occupants are exposed to the nonconforming nature of the property and whatever hazards and public safety problems are associated with it. This exposure to flood risk is unnecessary because the sole reason for granting the variance was the personal condition of the previous owner.

The variance criteria in §60.6(a) must be read as a whole and not piecemeal. Variances can be granted for new construction and substantial improvements only if all criteria in §60.6(a) and the local ordinance are met. If any one of the criteria is not met the variance should not be granted.

### **Floodways - §60.6 (a) (1)**

The floodway is defined (§59.1) as:

“the channel of a river or other water course and the adjacent land areas that must be reserved in order to discharge the base flood without cumulatively increasing the water surface elevation more than a designated height.”

It is important to reserve the floodway as a water conveyance area because any encroachments or obstructions placed in the floodway will increase flood heights and consequently flood damages. Thus, at §60.6 (a) (1):

“Variances shall not be issued by a community within any designated regulatory floodway if any increase in flood levels during the base flood discharge would result.”

The intent of this variance criterion is to prohibit non-conforming development that may increase flood levels which in turn would increase potential flood damages to other property owners.

In most cases there will be alternative locations for the proposed development outside the floodway, or other actions can be taken to compensate for increased flood stages or the floodway can be modified through flood control measures. If there is no feasible or practical alternative site to locate the development, then it must meet all criteria under §60.6 (a) and, in accord with §60.6 (d) (3), demonstrate that no increase in flood stages will result. Section 60.3 (d) (3) states that:

“the community shall prohibit encroachments, including fill, new construction, substantial improvements, and other development within the adopted regulatory floodway that would result in any increase in flood levels within the community during the occurrence of the base flood discharge.”

The only exceptions to this provision, located in §§60.3 (c) (13) and (d) (4) of the NFIP regulations, allow for the increases in flood levels under certain conditions and upon approval by the administrator.

In cases where all variance criteria in §60.6 (a) are met and a “no-rise” analysis and certification has been approved, the community may find it appropriate to issue a variance. However, because of the potential hazards involved, many states and communities exceed minimum NFIP requirements by prohibiting the issuance of variances for floodway development altogether, regardless of whether all variance criteria are met and a “no-rise” certification was made. Therefore, a community may wish to prohibit all variance requests based on three potential flood hazards in the floodway:

1. The hazard to the development itself;
2. The increased hazard which the development may cause to other properties;
3. The risk to individuals stranded in isolated structures surrounded by what is in many cases rapidly flowing, debris laden flood waters, and the risk to the rescue workers.

For example, the granting of a variance which allows the placement of a manufactured home below the BFE in a floodway will place the lives of its inhabitants at risk because during a flood it is likely that the manufactured home will be totally demolished. Aside from this danger, experience has shown that a manufactured home can float into other manufactured or conventional homes and result in severe structural damage; or, become wedged in a bridge opening or culvert, which could in turn dramatically increase flood heights upstream and endanger other citizens. Also, local emergency service personnel may be endangered attempting to rescue the occupants before the manufactured home is carried downstream.

Because of the hazards of granting variances for development in the regulatory floodway, community officials should carefully consider all of the possible dangers created by the variance issuance. In most cases, a review will indicate that the benefits of allowing the development are outweighed by the costs of increased future flood damage and increased hazards to life.

### **Lots of One-Half Acre or Less - §§60.6 (a) and (a) (2)**

“While the granting of variances generally is limited to a lot size less than one-half acre (as set forth in paragraph (a) (2) of this section), deviations from that limitation may occur. However, as the lot size increases beyond one-half acre, the technical justification required for issuing a variance increases.”

“Variances may be issued by a community for new construction and substantial improvement to be erected on a lot of one-half acre or less in size contiguous to and surrounded by lots with existing structures constructed below the base flood level, in conformance with the procedures of paragraphs (a) (3), (4), (5) and (6) of this section.”

A common, but unjustifiable argument for variance requests on lots of less than ½ acre is one based on personal convenience or aesthetics; i.e., the height inconsistency that would result between adjacent structures if the middle one was elevated to or above the BFE. Aesthetics or other personal considerations should never be a consideration when making variance determinations on ½ acre lots. Section 60.6 (a) (2) only addresses the physical, not the aesthetic characteristics of a lot in relation to the adjacent lots. In balancing considerations for personal issues versus issues related to public health and safety such as minimum NFIP criteria, a community should always choose public safety and the protection of lives and property.

The intent of the above variance criteria has been misinterpreted to mean that variances can be systematically granted for all intermediate or “in-fill” subdivision lots of less than ½ acre. Variances on “in-fill” lots of less than ½ acre are not automatic. The intent of §60.6 (a) (2) is not to place a lesser (or no) burden on ½ acre lots, but a greater burden on lots larger than ½ acre. Note that §60.6 (a) specifically states that “as the lot size increases beyond ½ acre, the technical justification required for issuing a variance increases.”

The ½ acre threshold pertaining to lot size is meant to be a general cutoff point and, as §60.6 (a) states, “deviations from that limitation may occur.” However, experience shows that for intermediate lots greater than ½ acre, a structure can, in nearly all instances be elevated on fill to or above the BFE without causing measurable drainage impacts to the adjacent structures whose lowest floor elevations are at or below grade. Because of the additional storage and infiltration capacity provided by larger lots, and because of the flexibility in being able to choose a least-impactive location on a large lot, the technical justification required for issuing a variance based on potential drainage problems increases as the lot size increases beyond ½ acre. However, conditions will vary based on the size of the structure relative to the size of the lot, as well as, the location of the structures relative to each other.

Many design and construction alternatives exist that will ease a hardship caused by potential drainage problems, while still allowing a structure in this situation to be built in full compliance with NFIP regulations. There are several acceptable elevation techniques that cause no more, and usually less disruption of drainage patterns than building a structure at ground level through a variance. Examples include: 1.) elevation of the structure on pilings, columns, or extended foundation walls; 2) grading or landscaping the elevated fill pad to drain away from the adjoining properties; and 3) creation of natural or artificial infiltration fields or systems located at the intersection of the fill slope and the natural ground. Many of these type alternatives can be cost effective as well as visually appealing in the community, while still not creating drainage problems for adjacent structures.

In summary, the granting of variances for small lots where elevation on fill will pose an exceptional hardship due to drainage problems should be rare. Variances for “in-fill” lots of ½ acre or less should be granted on the basis of potential drainage problems only 1) if, as §60.6 (a) (2) explicitly states, all other criteria [§§60.6 (a) (3), (4), (5), and (6)] are met, and 2) if a professional engineer or architect has prepared and certified data demonstrating that there are no technically feasible methods available to alleviate or mitigate the drainage problems.

#### **Good and Sufficient Cause - §60.6 (a) (3) (i)**

“Variances shall only be issued by a community upon a showing of good and sufficient cause.”

A variance request by an applicant that is based on good and sufficient cause is one that deals solely with the physical characteristics of the property, subdivision lot, or land parcel under question. A rendering of a good and sufficient cause should never be based on the character of the planned construction or substantial improvement, the personal characteristics of the owner or inhabitants, or local provisions that regulate non-health and public safety standards (e.g., aesthetic restrictions of subdivision homeowner associations).

“Good and sufficient” cause means that by granting a variance there is substantial and legitimate benefit to be achieved by numerous other citizens, or the community as a whole. It is not merely based on the convenience or financial relief that the variance would afford the applicant. Inconvenience, aesthetic considerations, physical handicaps, personal preferences, the disapproval of one’s neighbors, or homeowners’ association restrictions, likewise do not, as a rule, qualify as “good and sufficient” causes. “Good and sufficient” cause for a variance occurs when a parcel of property possesses physical characteristics so unusual that complying with NFIP regulation in a local ordinance would create an exceptional hardship to the applicant, the surrounding property owners, or the

community in general. In addition, the unusual physical characteristics must be unique to that property and not be shared by adjacent parcels or be typical of other lots in the community.

Physical conditions are inherent to the land or property and usually will not change or be significantly altered over time. Therefore, the justification for granting a variance based on physical characteristics will usually not be undermined over time. In contrast, personal characteristics and intended uses of buildings can change dramatically with changes in ownership. Likewise, local aesthetic and other non-health and safety restrictions are frequently altered over short periods of time. Thus, the justification for granting variances based on characteristics other than the physical conditions of the property can rapidly be compromised.

Once the character of the owner changes (i.e., the property is sold, leased, etc. or the owner no longer suffers from financial hardship) the justification for the variance no longer exists, but the structure remains. Future owner/occupants are exposed to the nonconforming nature of the property and whatever hazards and public safety problems are associated with it. This exposure to property and personal risk from flood damage is unnecessary except for the personal condition of the previous owner.

A common misinterpretation of what constitutes "good and sufficient cause" for granting a variance is based on the financial status or other monetary circumstances of the owner. Financial hardship of the property owner is never a good and sufficient cause for granting a variance. Granting a variance for construction in a flood hazard area based on financial hardship only increases the probability that owners least able to afford it will suffer even greater monetary adversity (not to mention health and safety risks) when the structure is damaged during a flood.

#### **Exceptional Hardship - §60.0 (a) (3) (ii)**

"Variances shall only be issued by a community upon a determination that failure to grant the variance would result on exceptional hardship to the applicant."

In determining whether or not an applicant has established an exceptional hardship sufficient to justify a variance, the variance or appeal board or other local governing body must weigh the applicant's hardship against community goals and the purpose of their floodplain management ordinance. In the case of variances from NFIP flood elevation or floodproofing requirements, this would mean asking which is more serious: the hardship that this individual applicant would face, or the community's need for strictly enforced regulations that protect its citizens from the dangers and damages of flooding? Only a truly exceptional, unique hardship relative to the physical character of a piece of property should persuade local officials to set aside provisions of an ordinance designed with the whole community's safety in mind.

The hardship might not have to be so severe if the applicant were seeking a variance to a setback ordinance, for instance, which was intended merely to simplify street repair and modifications. In the course of considering variances to flood protection ordinances, however, variance boards continually must face the more difficult task of frequently having to deny requests from applicants whose personal circumstances evoke compassion, but whose hardships are simply not sufficient to justify deviation from community-wide flood damage prevention requirements.

The hardship that would result from failure to grant a requested variance must be exceptional, unusual, and peculiar to the property involved. Inconvenience, aesthetic considerations, physical handicaps, personal preferences, the disapproval of one's neighbors, or homeowners association restrictions likewise cannot, as a rule, qualify as exceptional hardships. All of these problems can be resolved through other means, without granting a variance. This is so even if the alternative means are more expensive or complicated than building with a variance, or if they require the property owner to put the parcel to a different use than originally intended, or to build his or her home elsewhere.

For example, a situation in which it would cost a property owner several thousand dollars more to elevate a house to comply with the ordinance and an additional several thousand to build a wheelchair ramp or an elevator to provide access to that house for a handicapped member of the family might at first glance seem like the sort of problem that could be relieved by a variance. However, while financial considerations are always important to property owners and the needs of the handicapped person certainly must be accommodated, these difficulties do not put this situation in the category of "exceptional hardships" as they relate to variances. This is because the characteristics that result in the hardship are personal (the physical condition and financial situation of the people who propose to live on the property) rather than pertaining to the property itself. Also, the problem of the day-today access to the building can be alleviated in any one of a number of ways (going to the additional expenses of building a ramp or elevator),

without granting a variance. In fact, one method which facilitates the use of a structure for handicapped persons (especially those in wheel chairs) is to elevate the structure by means of earthen fill.

Third, the situation of handicapped persons occupying flood-prone housing raises a critical public safety concern. If a variance is granted and the building is constructed at grade, it will be absolutely critical that the handicapped or infirm person evacuate when floodwaters begin to rise, yet he or she may be helpless to do so alone. Not only does this pose an unnecessary danger to handicapped persons but also it places an extra demand on the community's emergency service personnel who may be called upon. If the building is properly elevated, the handicapped person can still be evacuated if there is sufficient warning and assistance available. If there is not, that person can, in all likelihood survive the flood simply by remaining at home safely above the level of the floodwaters.

More simply, the property owner's difficulties would not really be relieved by the variance, but likely only postponed and perhaps ultimately increased. It would be more prudent over the long run for the property owner and the community, if the variance were denied and the home built at the proper elevation with handicapped access. This will ensure the safety of all family members when floodwaters rise and also protect individual and community investment in the property, as discussed in the paragraphs on public safety and nuisances.

Another common argument for variances from the elevation requirement is the unaesthetic height differential with adjacent structures that would result. To promote architectural and aesthetic consistency, homeowners associations or subdivision boards frequently place restrictions on landscaping and construction practices, such as the total height to which structures can be built. The owner, and usually the prospective neighbors and local homeowners association, protest that the structure, if elevated, will be architecturally out of sync with the rest of the structures on the block and that property values will be decreased as a result.

Variance requests that claim exceptional hardships due to architectural considerations or conflicts with local subdivision regulations governing aesthetics should never be granted to waive regulations designed to protect the health and safety of residences. For the following reasons a community would be remiss in its responsibilities to its citizens if it placed appearance before public protection:

1. The hardship would be based on personal preference, not the property per se;
2. Most structures can be elevated such that they are aesthetically pleasing and architecturally consistent, despite the height difference;
3. Elevated structures are much less prone to flood damage, and, therefore, actually increase in value relative to adjacent unprotected structures, especially after they are damaged in a flood;
4. The health and safety risks placed on occupants of the unprotected structure are unnecessary and avoidable.

#### **Increased Flood Heights - §60.6 (a) (3) (iii)**

"Variances shall only be issued by a community upon a determination that the granting of a variance will not result in increased flood heights."

A development for which a variance is to be granted must not in any way cause an increase in water surface elevations during floods of any magnitude, not just the base flood. Therefore, for a community to grant a variance, all other variance criteria in Section 60.6 (a) must be met, and the applicant must demonstrate through technical justification that the proposed development will not increase flood heights.

The underlying principal is that an increase in flood heights has the potential to cause flood damage to structures in the community that otherwise would not be flood-prone. In addition, it has the potential to increase the depth of flooding, and thus the damage potential, of structures that are already flood-prone.

To allow increases in flood heights to occur unnecessarily is inconsistent with the objectives of sound floodplain management, and undermines the community's previous efforts to protect structures by requiring elevation or floodproofing to or above the BFE. Increases in flood heights subtract from the level of protection provided by these requirements.

#### **Public Safety and Nuisances - §60.6 (a) (3) (iii)**

"A variance will not cause additional threats to public safety or create nuisances."

Variances must not result in additional threats to public safety or create nuisances. Local flood damage prevention ordinances (including elevation and floodproofing requirements) are intended to help protect the health, safety, well being, and property of the local citizens. This is a long range community effort usually made up of a combination of approaches such as adequate drainage systems, warning and evacuation plans, keeping new property (especially homes) above the flood levels, and participating in an insurance program. These long-term goals can be met if exceptions to the laws are kept to a bare minimum.

Variances to allow the construction of habitable structures below the BFE, especially in the higher hazard areas such as floodways, places residents of those structures at much greater personal risk. The potential for loss of life is much greater in structures whose first floor is below the BFE, and where flood depths are greater than three feet or velocity is present. A community which grants variances to waive elevation requirements in these situations is doing a disservice to its citizens. In addition, a community may be held liable for personal injuries or loss of life which occurs to occupants of structures for which a non-compliant variance has been granted.

It is often argued that variances to waive the elevation requirement should be granted for structures where handicapped or elderly persons will be occupants. The basis for this argument is that elevation of the structure will make wheelchair access difficult (i.e., long and expensive ramps) or that elderly people are not physically capable of climbing stairs. However, for the same exact reasons, handicapped and elderly people are much less able to quickly evacuate flood-prone structures. They are much more likely to become trapped inside structures if not aware of the imminent and worsening flood hazard or when flood waters rapidly rise. Therefore, it is difficult to imagine a case where a variance would be appropriate for structures when there is to be handicapped and/or elderly occupancy.

Not only does a community's public safety commitment apply to residents of structures located in flood hazard areas, but also to local emergency services personnel. Variances from the elevation requirement increase the risk exposure for personnel required to rescue residents of structures flooded because of the variance. Simply, if structures are elevated to or above the BFE, residents can in all likelihood, survive the flood by remaining at home safely above the level of the waters. The necessity to rescue residents of elevated structures is not as great and local emergency services personnel can concentrate their efforts to areas of greater need.

#### **Public Expense – §60.6 (a)(3)(iii)**

“Variances shall only be issued by a community upon a determination that the granting of a variance will not result in extraordinary public expense.”

The public expense is usually monetary (government funds), but can also be non-monetary. An example of extraordinary public expense is the repair or replacement of public facilities and infrastructure damaged by a flood because of a variance issuance. Another example is the construction of flood control projects or other public works to protect structures prone to flooding because of the issuance of variances. There are also public costs associated with emergency floodproofing measures such as sandbags and temporary floodwalls built (with public funds) to protect structures flooded because they were issued a variance from elevation requirement.

The time and equipment expended by emergency services personnel during the rescue of residents of flooded structures is significant public expense. This time and expense is unnecessary, and therefore “extraordinary”, if it is spent rescuing residents of structures for which variances were granted. There is also a significant “missed opportunity” (non monetary) public expense if an otherwise avoidable injury or death occurs while rescue personnel are busy evacuating structures for which variances were issued.

National expenditures in the form of various Federal disaster assistance programs (e.g., FEMA, SBA, etc.), non-government assistance (e.g., Red Cross), and other charity donations are also public expenses. Residents of structures flooded because of the issuance of variances may be entitled to one or more of these many forms of assistance; an increased public expense that, without a variance issuance, could be avoided. Specifically, residents of flooded structures (for which variances have been granted) may qualify for personal grants and monies to provide temporary housing under the terms of FEMA's Disaster Assistance Program.

Another form of public expense occurs when owners of heavily damaged structures (for which variances were granted) can not afford repairs, and abandon them. When local government is held responsible for repair or demolition (which is usually the case) the additional expense incurred by the public should be considered “extraordinary” because it would not have occurred had a variance not been issued.

### **Fraud and Victimization - §60.6(a)(3)(iii)**

“Variances shall only be issued by a community upon a determination that the granting of a variance will not cause victimization of the public.”

When considering a variance request, local variance boards should consider the fact that every newly constructed building adds to the local government responsibilities and remains a part of the community for fifty or more years. Buildings that are permitted to be constructed below the base flood elevation are subject during all those years to increased risk of damage from floods, while future owners of the property and the community as a whole are subject to all the costs, inconvenience, danger, and suffering that those increased flood damages bring.

One of the biggest potential problems involving variances is the change of ownership of a structure for which a variance has been granted. Future owners that purchase the property may be unaware that it is subject to potential flood damages and can be insured only at very high flood insurance rates. Frequently, resale happens after the structure has been flooded. The original owner repairs the structure and removes all evidence of previous flooding. The structure is then put up for sale in an attempt to “unload” it on prospective buyers that are new to the area or who are otherwise unfamiliar with extent and nature of the local flood hazard.

An example of public victimization is the case of a variance request to waive elevation requirements for mini-warehouse. The units or “bays” of the warehouse are rented to the public for various personal uses such as the storage of excess furniture. Granting a variance in this case would create the potential for victimization of citizens who, unknowing of the flood hazard and the risk to their property, rent units to store their possessions. When the warehouse is flooded and its contents (which are not covered by flood damage by a homeowner’s policy) are damaged, the owners may have no recourse for financial compensation. In addition, many stored possessions that are damaged may be family heirlooms, have sentimental or historic value, or otherwise be irreplaceable. Variances that have the potential to cause this type of victimization or fraud on the public should never be granted.

### **Existing Local Laws or Ordinances – §60.6(a)(3)(iii)**

“Variances shall only be issued by a community upon a determination that the granting of a variance will not result in conflict with existing local laws or ordinances.”

A community is authorized to grant variances from their local floodplain ordinances provided that the variance is not in conflict with other existing Federal or State laws and regulations that, by statute, the community is required to obey and enforce. Examples of local laws protecting environmental and other natural resources. In addition, variances granted by a community must comply with the provisions of State zoning and enabling legislation and case law.

### **Minimum Necessary to Afford Relief – §60.6 (a)(4)**

The variance that is granted should be for the minimum deviation from the local requirements that will still alleviate the hardship. In the case of variances to an elevation requirement, this means the community need not grant permission for the applicant to build at grade or even to whatever elevation the applicant proposes, but only to that level that will both provide relief and preserve the integrity of the local ordinance.

For example, if the BFE is ten feet above natural grade, and only a three-foot waiver is necessary to avoid a legitimate hardship, then the community should require that the structure be elevated seven feet. Or, using this example, if the structure had to be built on grade to afford relief, the variance should still stipulate that all utilities and finished interior workings (and other damageable property) be elevated to or above the BFE (or to the maximum extent possible or practically feasible) in order to reduce the potential of flood damage.

The variance must be the absolute minimum necessary to relieve the hardship, which means the absolute maximum to prevent or reduce future flood damages. When a variance waiving the elevation/dry floodproofing requirements is granted, the “minimum necessary” includes the implementation of 1) “wet floodproofing” techniques and/or 2) provisions in §60.3(a)(3) which require the structure to:

“(i) be designed (or modified) and adequately anchored to prevent flotation, collapse, or lateral movement of the structure resulting from hydrodynamic and hydrostatic loads, including the effects of buoyancy, (ii) be constructed with material resistant to flood damage, (iii) be constructed by methods and practices that minimize flood damages, and (iv) be constructed with electrical, heating, ventilation, plumbing, and air

conditioning equipment and other service facilities that are designed and/or located so as to prevent water from entering or accumulating within the components during conditions of flooding.”

In summary, very rarely will there be justification to grant a “blanket variance” which waives all NFIP requirements. There will almost always be something that can feasibly be done to the structure to reduce the potential for flood damages.

#### **Disclosure – §60.6(a)(5), §60.22 (c)(3)(ii)**

Community officials must notify the applicant that the issuance of a variance to construct a structure below BFE will result in increased premium rates for flood insurance and that such construction below BFE increases risks to life and property.

Specifically, it is stated in §60.0(a)(5) that:

“a community shall notify the applicant in writing over the signature of the community official that (i) the issuance of a variance to construct a structure below the base flood level will result in increased premium rates for flood insurance up to amounts as high as \$25 for \$100 of insurance coverage and (ii) such construction below the base flood level increases risks to life and property. Such notification shall be maintained with a record of all variance actions as required in paragraph (a)(6) of this section.”

In addition, under §60.22 (c) (3)(ii), “Planning Considerations in Flood Prone Areas”, it is recommended that a community consider implementing:

“full disclosure to all prospective and interested parties (including but not limited to purchasers and renters) that variances have been granted for certain structures located within flood-prone areas.”

Such a disclosure is important and necessary to inform subsequent buyers of structures for which a variance was granted to build below BFE.

From a public safety standpoint, the prospective buyer has a right to know that the structure will be susceptible to flooding and its occupants subject to risk. From a financial standpoint, the prospective buyer has the right to know that the structure and its contents will be susceptible to damage. All prospective owners of these structures who desire flood insurance should be made aware, before closing, that the premium rates applied to these structures can be extreme, and possibly prohibitively high.

Often the variance applicant does not wish, or is not forced under the mandatory purchase requirement, to purchase flood insurance at the time the variance is granted and high rates are not a problem. However, at some later date, especially after a structure has experienced flooding, there may be a desire by the owner to purchase flood insurance. In addition, prospective buyers of a structure for which a variance has been granted may desire or be required to purchase flood insurance and may be discouraged from acquiring the structure because of the high rates. This situation can be compounded when an unsuspecting buyer purchases such a structure and discovers at a later date that insurance is required, but at a prohibitive cost. This can result in an economic hardship to an innocent party.

#### **Functionally Dependent Uses – §60.6 (a) (7)**

“Variances may be issued by a community for new construction and substantial improvements and for other development necessary for the conduct of a functionally dependent use provided that (i) the criteria of paragraphs (a)(1) through (a)(4) of this [60.6] section are met, and (ii) the structure or other development is protected by methods that minimize flood damages during the base flood and create no additional threats to public safety.”

As defined §59.1, a “functionally dependent use” means a use that cannot perform its intended purpose unless it is located or carried out in close proximity to water. The term includes only docking facilities that are necessary for the loading and unloading of cargo and passengers, and shipbuilding and repair facilities, but does not include the long-term storage or related manufactured facilities.

Long-term storage or related manufactured facilities can be located outside of the floodplain or fully comply with all NFIP requirements. These uses are therefore excluded from the definition of “functionally dependent use”. The intent of this is to limit variances only to the practical problems of building and repairing ships, of loading cargo and

passengers from vessels, and moving the cargo onto other forms of transportation or to long-term storage facilities that fully comply with NFIP criteria.

In accordance with §60.6(a)(7), communities may grant variances for new construction or substantial improvement and for other development necessary for the conduct of functionally dependent uses. However, all variance criteria must be met and the structures or other development must be protected by methods which minimize flood damages during the base flood.

When applied to some functionally dependent uses such as port facilities, the seafood industry or shipbuilding, NFIP floodplain management criteria can usually be met, with the industry still being able to operate as intended. A 1983 FEMA study entitled *“Effect of Floodplain Regulations on Inland Port Facilities”* identified few instances where ports could not be built in compliance with the regulations while several examples were given of ports that have met all standards.

However, because functionally dependent uses must be located on or adjacent to water to operate, there can be serious practical and operational difficulties resulting in exceptional hardship due to the physical characteristics of the property if a variance is not granted. Typically of concern to the port industry are the elevation and watertight floodproofing requirements in §60.3(d)(3). In addition, problems occasionally arise in dealing with various V-zone requirements in §60.3(e), especially those covering pile and column construction, breakaway walls, prohibition of fill for structural support, and location of new construction landward of mean high tide. Except for the floodway requirements, there feasible alternative methods for creating no additional threats to public safety and achieving a comparable degree of protection from flood damages for the types of structures that normally accompany functionally dependent uses.

Therefore, in accordance with §60.6(a)(4), a variance can be used to address the unique problems of functionally dependent uses if it is for “the minimum necessary to afford relief considering the flood hazard” (§60.6(a)(4)).

When evaluating variances for functionally dependent uses, the primary concerns should be that flood damages will be minimized during the base flood and that no additional threats to public safety will be created. A community that varies individual standards for functionally dependent uses, but still uses methods to reduce flood damages to the maximum extent possible or practically feasible does not jeopardize its NFIP eligibility.

As with existing variance criteria under §60.3(a)(1), no variances for functionally dependent uses may be issued within any designated regulatory floodway if any increases in flood levels would increase potential flood damages to other property owners. In many situations there will be feasible locations outside of the floodway for a functionally dependent use. In a functionally dependent use has no option but to locate in a floodway, the applicant must either demonstrate that no increase in flood stages will result or must provide additional floodway carrying capacity such as through channel improvements to ensure that no increase in flood stage will result. Communities should be instructed to contact FEMA regional offices for technical assistance if they encounter situations where functionally dependent uses must locate in a floodway, but cannot meet the no-increase-in-floodstage requirement.

#### **Historic Structures – §60.6(a)**

“Variances may be issued for the repair or rehabilitation of historic structures upon a determination that (i) the proposed repair or rehabilitation will not preclude the structure’s continued designation as a historic structure and (ii) the variance is the minimum necessary to preserve the historic character and design of the structure.”

The original intent of providing special treatment to historic structures was to comply with the intent of the Historic Preservation Act of 1966 by 1) allowing historic structures to always maintain Pre-FIRM, subsidized insurance rates and, 2) minimizing the adverse impacts of NFIP requirements on the historic integrity of historic structures. However, it is stipulated under §60.6(a) that the variance be the minimum deviation necessary to preserve both the historic character of the structure and its designation as a historic building. It should be noted that communities that do not require historic structures to meet variance criteria may exempt historic structures through the substantial improvement requirement without requiring the minimum necessary to afford relief provision.

The granting of a variance should be based on a structure-by-structure review to determine whether elevation (or floodproofing if a non-residential structure is involved) to or above the BFE would destroy the historic character or design of the structure. If so, a variance for that structure may be granted. Variances should never be granted for portions of, or entire historic districts, but only for individual historic structures.

For example, if elevation of a historic structure would destroy its character and cause a loss of its Department of Interior (DOI) designation, a variance for the elevation requirement may be considered. However, the owner of the structure should still be required, in accordance with §60.6(a)(40, to do the following where feasible: 1) elevate all utilities and finished interior and exterior improvements wherever possible; and/or 3) raise the interior floors to or above the BFE or to the maximum extent possible (this is often technically feasible in older structures with high ceilings).

Physical alterations made to a “historic structure” which would otherwise constitute a substantial improvement must not result in the de-listing of the structure from its DOI certified, state, or local inventory status. If such alterations cause the structure to lose its official listing or historic status, the structure would no longer be a “historic structure” for the purposes of the NFIP and would be considered a substantial improvement and therefore, comply with the NFIP requirements for new construction.

For further background on the pertinent regulations, procedures and adopted nomenclature of the DOI as they pertain to historic structures see **36 CFR 61.4, 61.5, 67.2, 67.4, 67.5, and 67.10.**

# **APPENDIX H**

## **RESOURCES FOR FLOODPLAIN MANAGEMENT ASSISTANCE**

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***Virginia Local Official's Guide to Floodplain Management***

# FLOODPLAIN MANAGEMENT RESOURCES

## FEMA PUBLICATIONS

**Web Sites with Publications:** Flood Hazard Mapping – [www.fema.gov/fhm/frm\\_docs.shtm](http://www.fema.gov/fhm/frm_docs.shtm)  
Online Tutorials for Mapping – [www.fema.gov/fhm/ot\\_main.shtm](http://www.fema.gov/fhm/ot_main.shtm)  
NFIP – [www.fema.gov/nfip/libfacts.shtm#3](http://www.fema.gov/nfip/libfacts.shtm#3)  
Flood Insurance – [www.fema.gov/nfip/library.shtm](http://www.fema.gov/nfip/library.shtm)  
Flood Smart – [www.floodsmart.gov/floodsmart/pages/index.jsp](http://www.floodsmart.gov/floodsmart/pages/index.jsp)  
Hazard Maps – [www.esri.com/hazards/makemap.html](http://www.esri.com/hazards/makemap.html)  
Preparation - [www.fema.gov/library/prepandprev.shtm](http://www.fema.gov/library/prepandprev.shtm)  
Disasters - [www.fema.gov/library/dizandemer.shtm](http://www.fema.gov/library/dizandemer.shtm)  
FEMA Information - [www.fema.gov/library/femainfo.shtm](http://www.fema.gov/library/femainfo.shtm)

**FEMA-15** -*Design Guidelines for Flood Damage Reduction* - Provides general information about flooding and how to properly design and build in floodprone areas.

**FEMA-54** -*Elevated Residential Structures* -Covers proper design and construction methods for elevated homes.

**FEMA-55** -*Coastal Construction Manual* -Demonstrates design and construction techniques for construction in coastal high hazard areas.

**FEMA-85** -*Manufactured Home Installation in Flood Hazard Areas* -Contains information about how to properly site and install a manufac- tured home in a flood hazard area, with emphasis on design of elevated foundations.

**FEMA-100** - *A Unified National Program for Floodplain Management* - Updates a 1979 report which presents strategies fundamental to implementing a balanced approach to floodplain management.

**FEMA-102** -*Floodproofing Non-Residential Structures* -describes a variety of floodproofing strategies for commercial and industrial structures.

**FEMA-114** -*Design Manual for Retrofitting Floodprone Residential Structures* -presents floodproofing techniques that can be used for existing residential structures.

**FEMA-116** -*Reducing Losses in High Risk Flood Hazard Areas: A Guidebook for Local Officials* -Designed to help local government improve floodplain management programs for high risk flood hazard areas.

**FEMA 186** -*Mandatory Purchase of Flood Insurance Guidelines* -presents an overview of the Flood Disaster Protection Act of 1973 and the National Flood Insurance Reform Act of 1994 as it amends the Act of 1973 to explain the applicable statutes or regulations.

**FEMA-213** - *Answers to Questions About Substantially Damaged Buildings* - Provides guidance for determining whether a building has been substantially damaged.

**FEMA 234 - *Repairing Your Flooded Home*** – Provides guidance on critical home repairs and safety measures to follow after a flood event.

**FEMA 257 - *Mitigation of Flood and Erosion Damage to Residential Buildings in Coastal Areas*** – This publication provides information to local officials and the general public and documents the broad range of non-structural mitigation activities undertaken nationwide in communities exposed to coastal flooding and erosion.

**FEMA 258 - *Guide to Flood Maps. A how-to booklet for reading Flood Insurance Rate Maps (FIRMS)*** – This document was designed to assist community officials, property owners, and others in reading and understanding flood maps.

**FEMA 259 - *Engineering Principles and Practices for Retrofitting Flood Prone Residential Buildings*** – Provides engineering design and economic guidance to engineers, architects, and local code officials about what constitutes technically feasible and cost-effective retrofitting measures for floodprone residential structures.

**FEMA-265 - *Managing Floodplain Development in Approximate Zone A Areas*** – A guide for use by community officials, property owners, developers, surveyors, and engineers who may need to determine Base Flood Elevations (BFEs) in Special Flood Hazard Areas designated as approximate Zone A on Flood Insurance Rate Maps.

**FEMA-268 - *Protecting Floodplain Resources*** – A guidebook for officials and citizens at the local level on protecting natural resources in floodplains. Offers suggestions for creating strategies for wisely managing floodplain natural resources.

**FEMA-301 - *Increased Cost of Compliance Coverage: Interim Guidance for State and Local Officials*** – Provides information on the Increased Cost of Compliance coverage and how it relates to communities' administration of floodplain management laws or ordinances following a flooding event.

**FEMA 311 - *Guidance on Estimating Substantial Damage Using the NFIP Substantial Damage Estimator*** – Communities that participate in the National Flood Insurance Program (NFIP) often have difficulty determining whether structures meet the NFIP definition of being substantially damaged. This is particularly true after a major flood or other disaster in which large numbers of buildings have suffered damage and there is a pressing need to provide damage determinations so that reconstruction can begin. Structures in Special Flood Hazard Areas that are substantially damaged must be brought into compliance with the minimum requirements of that community's laws or ordinances and the NFIP. To assist communities in making such determinations, FEMA developed the ***Residential Substantial Damage Estimator*** software, which provides guidance in estimating building value and damage costs for both single family and manufactured homes. Based on the regulatory requirements of the NFIP, it is intended to be used in conjunction with industry-accepted residential cost estimating guides. The guidance document provides information on how to use the software as well as how to collect data and conduct field inspections.

**FEMA 312 - *Homeowner's Guide to Retrofitting: Six Ways to Protect Your House from Flooding*** – As a homeowner, you need clear information about the options that are available to reduce flood damage to your home – and straightforward guidance on selecting the option that is best for you. Quite often this is a difficult task. The publication described here is for readers who have little or no knowledge of flood protection methods or building construction techniques.

**FEMA-347** - *Above the Flood: Elevating Your Floodprone House* – This publication is intended for builders, code officials and homeowners and provides information

**FEMA 348** - *Protecting Building Utilities from Flood Damage* – This publication is intended for developers, architects, engineers, builders, code officials and homeowners and provides guidance on principles and practices for the design and construction of flood resistant utility systems

**FEMA 467-1** – *Floodplain Management Bulletin: Elevation Certificate* - The **Elevation Certificate** (FEMA Form 81-31, download at [www.fema.gov/nfip/elvinst.shtm](http://www.fema.gov/nfip/elvinst.shtm)) is an important administrative tool of the NFIP. It is used to determine the proper flood insurance premium rate; it can be used to document elevation information necessary to ensure compliance with community floodplain management regulations; and it may be used to support a request for a Letter of Map Amendment (LOMA) or Letter of Map Revision based on fill (LOMR-F). This Floodplain Management Bulletin addresses frequently asked questions about the National Flood Insurance Program (NFIP) Elevation Certificate.

**FEMA Guidelines and Specifications for Flood Hazard Mapping Partners** – In this document, FEMA defines technical requirements, product specifications for flood hazard maps and related National Flood Insurance Program products, and coordination and documentation activities. The files are available for download at [www.fema.gov/fhm/dl\\_cgs.shtm](http://www.fema.gov/fhm/dl_cgs.shtm).

**FIA-12** - *Appeals, Revisions, and Amendments to Flood Insurance Maps: A Guide for Community Officials* – Details how to obtain revisions to FEMA flood risk maps.

**FIA-13** - *Flood Emergency and Residential Repair Handbook* – Outlines for the homeowner those actions that can be taken before and after a flood to help reduce damage and speed repairs.

**MitDiv-2** - *Answers to Questions About the NFIP* - Provides non-technical answers to questions frequently asked about the National Flood Insurance Program by community officials, present and prospective policyholders, real estate agents, lenders, and others.

**MitDiv-12** - *Appeals, Revisions, and Amendment to Flood Insurance Maps: A Guide for Community Officials* – Details how to obtain revisions to FEMA flood risk maps.

**MT-1:** *Application Forms for Conditional and Final Letters of Map Amendment and Letters of Map Revision Based on Fill* – The application forms included in these files were designed to assist requesters (community officials, individual property owners, and others) in gathering the information FEMA needs to determine whether property (parcel[s] of land or structure[s]) is likely to be flooded during the flood event that has a 1% chance of being equaled or exceeded in any given year (base flood). The forms in this package shall be used to request Letters of Map Amendment (LOMAs), Conditional Letters of Map Amendment (CLOMAs), Letters of Map Revision Based on Fill (LOMR-Fs), and Conditional Letters of Map Revision Based on Fill (CLOMR-Fs). The files are available for download at [www.fema.gov/fhm/dl\\_mt-1.shtm](http://www.fema.gov/fhm/dl_mt-1.shtm).

**MT-2:** *Application Forms for Conditional Letters of Map Revision and Letters of Map Revision* – The application forms included in these files were designed to assist requesters (community officials, individual property owners, and others) in gathering the information FEMA needs to

determine whether property (parcel[s] of land or structure[s]) is likely to be flooded during the flood event that has a 1% chance of being equaled or exceeded in any given year (base flood). The forms in this package shall be used to request Conditional Letters of Map Revision (CLOMRs) and Letters of Map Revision (LOMRs). The files are available for download at [www.fema.gov/fhm/dl\\_mt-2.shtm](http://www.fema.gov/fhm/dl_mt-2.shtm).

**MT-EZ:** *Application Form for Single Residential Lot or Structure Amendments to National Flood Insurance Program Maps* – This form should be used by an individual property owner to request that FEMA remove a single structure or a legally recorded parcel of land or portion thereof from a designated Special Flood Hazard Area, an area that will be inundated by the flood having a 1% chance of being equaled or exceeded in any given year (base flood), via Letter of Map Amendment (LOMA). The files are available for download at [www.fema.gov/fhm/dl\\_mt-ez.shtm](http://www.fema.gov/fhm/dl_mt-ez.shtm).

## VIRGINIA PUBLICATIONS

1. **The Floodplain Management Plan for the Commonwealth of Virginia**
2. **Virginia Citizen's Guide to Floodplain Management: Guidance for Those Living & Developing in the Floodplain**
3. **Virginia Local Official's Guide to Floodplain Management: Guidance for Those Regulating Development in the Floodplain**
4. **The Virginia Statewide Flood Map Modernization Business Plan**
5. **Floodplain Management Fact Sheets**

## FEDERAL CONTACTS

1. FEMA Distribution Center: Publications are available from the center by calling, FAXing mailing a request to:

FEMA Distribution Center  
8241-A Sandy Court  
P.O. Box 2012  
Jessup, MD 20794  
Telephone: 1-800-480-2520  
Fax: 1-301-362-5335

All requests for printed copies of effective Flood Hazard Boundary Maps (FHBMs), Flood Insurance Rate Maps (FIRMs), and Flood Insurance Study Reports should be submitted to FEMA's Map Service Center. You may contact the Map Service Center toll free, either by telephone at (800) 358-9616 or by facsimile at (800) 358-9620. For more information on the publications available contact the Map Service Center (<http://store.msc.fema.gov>)

2. The CRS Application and other information are available at:

NFIP/ CRS  
P. O. Box 501016  
Indianapolis, Indiana 46250-1016  
Telephone: (317) 848-2898

Fax: (317) 848-3578

3. Assistance with flood maps, flood insurance studies, and Letters of Map Change is available at the FEMA Map Assistance Center (FMAC) toll-free at 1-877-336-2627 (FEMA MAP).
4. Letters of Map Change and External Data Requests should be sent to the MOD team for processing at the address listed below:

FEMA Depot  
3601 Eisenhower Avenue  
Alexandria, VA 22304-6425

To expedite processing, please address your request to the attention of the following processing specialists:

- ♦ **ATTENTION: LOMC DEPOT** (Use for Letters of Map Revision-Based on Fill, Letters of Map Amendment, Conditional Letters of Map Revision-Based on Fill, Conditional Letters of Map Amendment, Letters of Map Revision and Conditional Letters of Map Revision)
- ♦ **ATTENTION: FEMA PROJECT LIBRARY** (Use for External Data Requests)

You also have the option of faxing your request to one of the following numbers: For LOMCs: 703-751-7415 For External Data Requests: 703-751-7391.

## **STATE CONTACTS**

1. For assistance and requests regarding the flood studies and mapping in Virginia, NFIP, and Floodplain Management:  
Virginia NFIP Coordinator  
Department of Conservation and Recreation  
203 Governor Street, Suite 206  
Richmond, Virginia 23219-2019  
(804) 786-8073
2. For assistance and requests regarding hazard mitigation grants:  
Virginia Hazard Mitigation Officer  
10501 Trade Court  
Richmond, VA 23236  
Phone: (804) 897-8500